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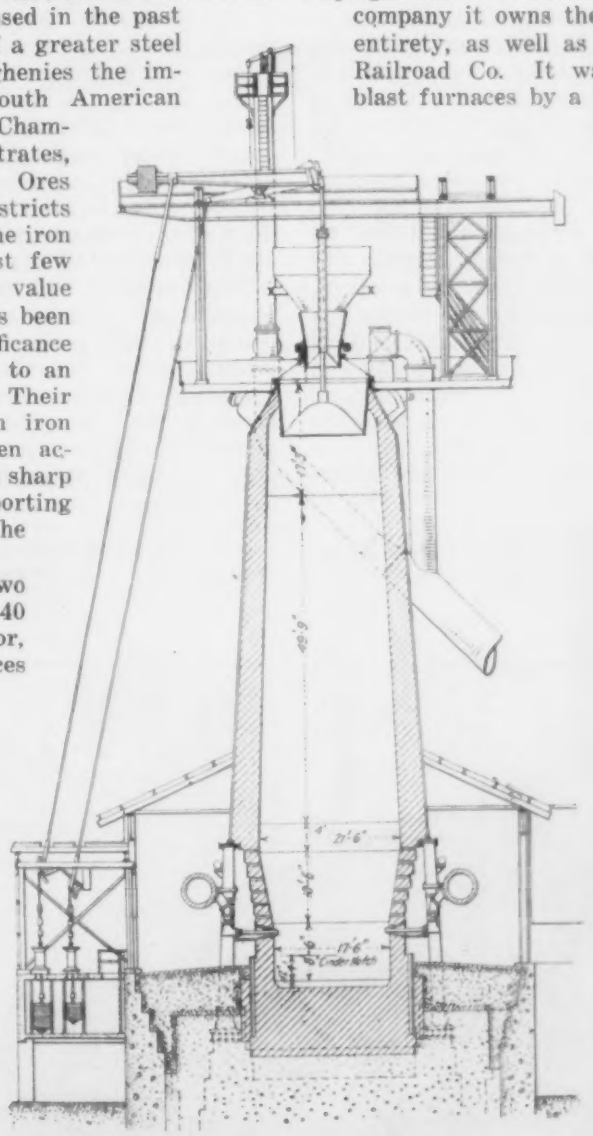
New Blast Furnaces of Replogle Steel Co.

Important Addition to New Jersey's Iron Industry—Large Ore Development at Wharton, With Increased Output of Magnetic Concentrates

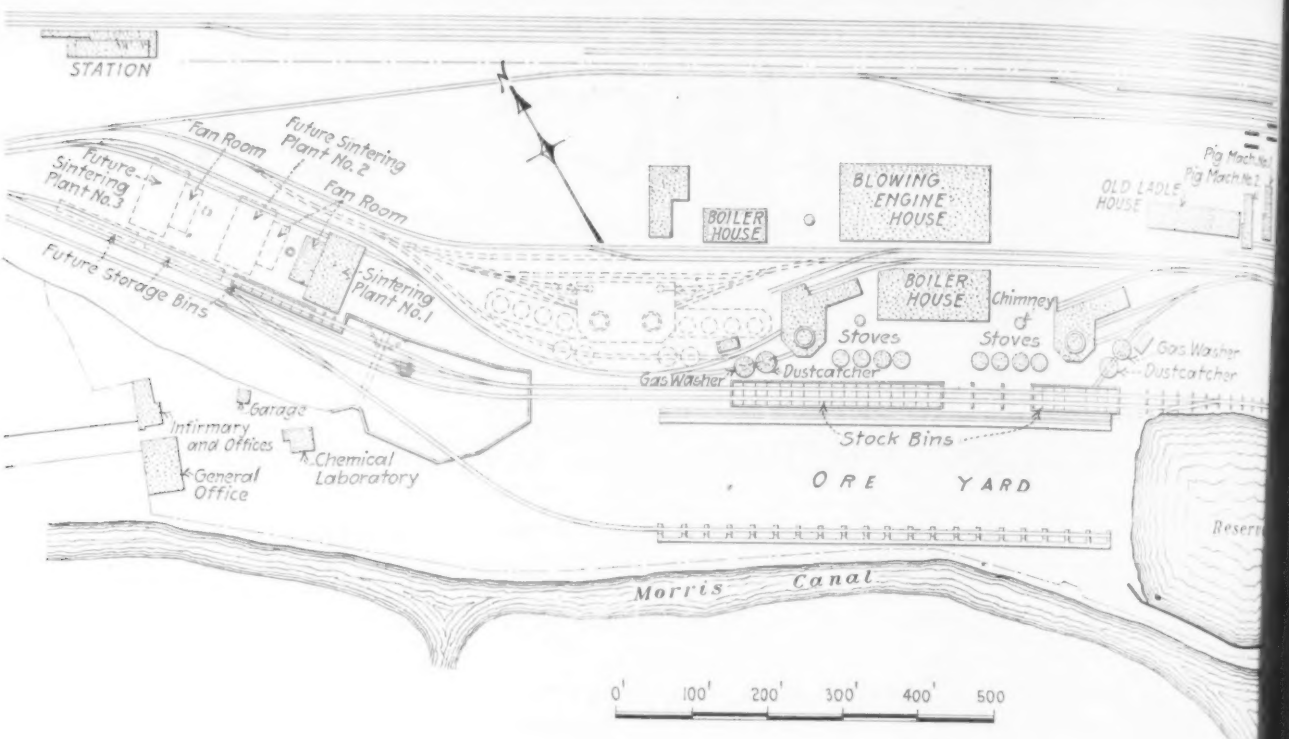
NEW importance has attached to Eastern steel plant developments in the past decade, quite apart from the various projects for blast furnaces and steel works in New York harbor based on Adirondack and New Jersey ores or the alternative proposal for a steel plant at Newport News based on West Virginia coke and Cuban ore. In all plans that have been discussed in the past 25 years for the building of a greater steel industry east of the Alleghenies the importation of Cuban or South American ores, or a large use of Lake Champlain and New Jersey concentrates, has figured prominently. Ores from both the last named districts have long been familiar to the iron trade, but only in the past few years have the extent and value of these Eastern magnetites been appreciated or their significance as a guaranty of long life to an enterprise built upon them. Their importance to the Eastern iron and steel industry has been accentuated very lately by the sharp advance in the cost of transporting Lake Superior ores to the East.

At Wharton, N. J., two miles from Dover, which is 40 miles from New York harbor, two modern blast furnaces are nearing completion, which mark one of the longest forward steps that have been taken in the utilization of Eastern magnetite and at the same time point to the establishment of a new place for New Jersey in the production of iron and steel. The Wharton Steel Co., under the ownership of the late Joseph Wharton, for many years produced pig iron at Wharton, mining and concentrating the nearby magnetites. Three blast furnaces were in operation for the early 1900's, but from 1911 the entire plant was idle until the latter part of 1916, when all the Wharton property was acquired by J. Leonard Replogle and associates. In the remainder of the war period the furnaces were active producers of pig iron. On Oct. 30, 1919, the Replogle Steel Co. was incorporated. As a holding company it owns the Wharton Steel Co. in its entirety, as well as the Wharton & Northern Railroad Co. It was decided to replace the blast furnaces by a new plant and in the past ten months the work has been under way. The old No. 1 furnace, the smallest of the three, was razed to make room for the expansion planned, and the two new furnaces, on new foundations, occupy the sites of the old Nos. 2 and 3 which were taken down.



Section of the New Wharton Blast Furnaces. Inwall lines and bosh angle are noteworthy

The accompanying drawings and half-tone views give a good idea of the magnitude of the work that has been under way and are suggestive of what the future has in store in the carrying out of the plans of the owners, the new furnaces, ore handling and auxiliary plant involving an outlay of about $3,000,000. This article will take up first the blast furnace plant and afterward the extensive new iron mining and concentrating operations, which will make continuously available for the blast furnaces a steady supply of iron ore of high quality in a form insuring regular and effective furnace operation. The illustrations show two furnaces nearly

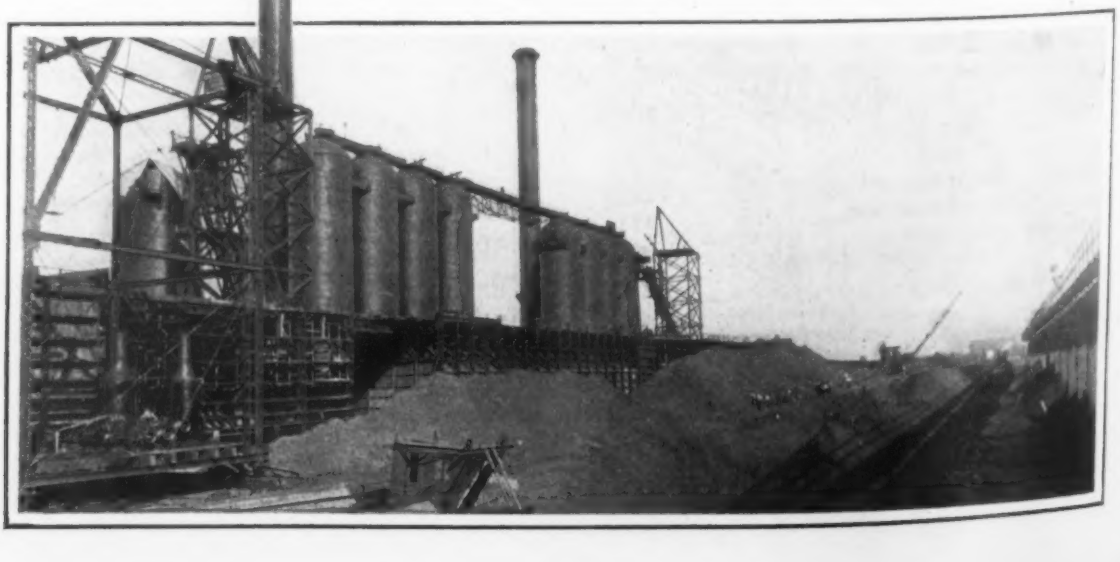


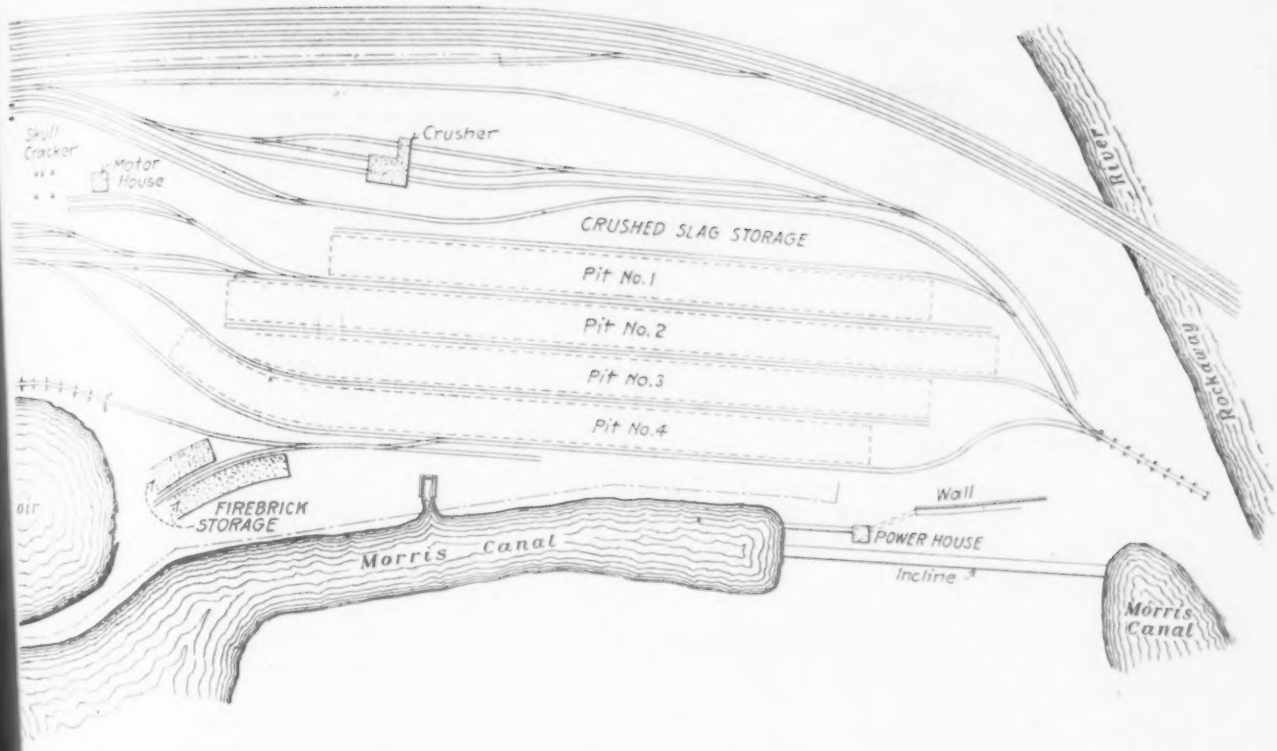
Plan of Replogle Steel Co.'s Blast Furnaces at Wharton, N. J., Showing Or

completed and the space that already has been allotted for the two furnaces to be built when the plans of the management for a steel plant are carried out. The furnace site, including ore yard, slag dump and all the ground occupied by auxiliary plant, takes up 100 acres, about half of it being slag dumping ground. The plan view shows the relation of the ore trestle to the ore yard and of the stock bins to the furnace. There are 20 stock bins for each stack and the two coke bins hold 400 tons each. The trestle for incoming ore is 800 ft. long. The ore bins are made with iron bottoms and 3-in. hardwood sides. As will be seen, the ore yard, which is 603 ft. long, is flanked by the trestle for ore that is stocked and on the other side by the bins into which ore for immediate use is unloaded from drop-bottom cars. There was a bin system for ore in the original furnace plant and these bins are being rebuilt and modernized. From the coke bins the coke discharges into a skip car. The ore bridge has a travel of 600 ft. and has a 160-ft. span, with an overhang on the bin side of 68 ft. It is 58 ft. 6 in. from the ore yard level to the bottom of the grab bucket. Storage room is provided for 283,000 tons of ore.

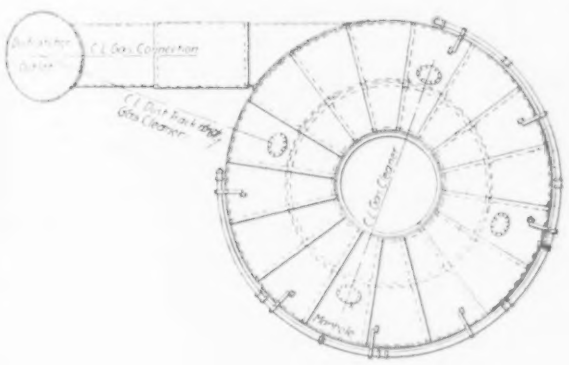
Flexibility in the handling and use of ore is secured by the arrangement of tracks and trestles. Incoming ore, if it is to be stocked in the ore yard, is carried over the ore dumping track shown on the south side of the furnace property and on to a new concrete-steel trestle 600 ft. long. From this it is dropped to the yard, thence to be taken up later by the ore bridge and deposited on the proper stock pile. Such of the concentrates from the Replogle mine as are to be converted into sinter (probably 25 per cent will be sintered) will be unloaded into storage bins adjacent to the sintering equipment at the west approach to the furnaces and ore yard. Concentrates brought from the mines are handled in power-operated side-dump cars and the unloading at the furnaces, whether at bin system, sintering plant or storage yard, involves only the labor of the train crew. Already upwards of 30,000 tons of concen-

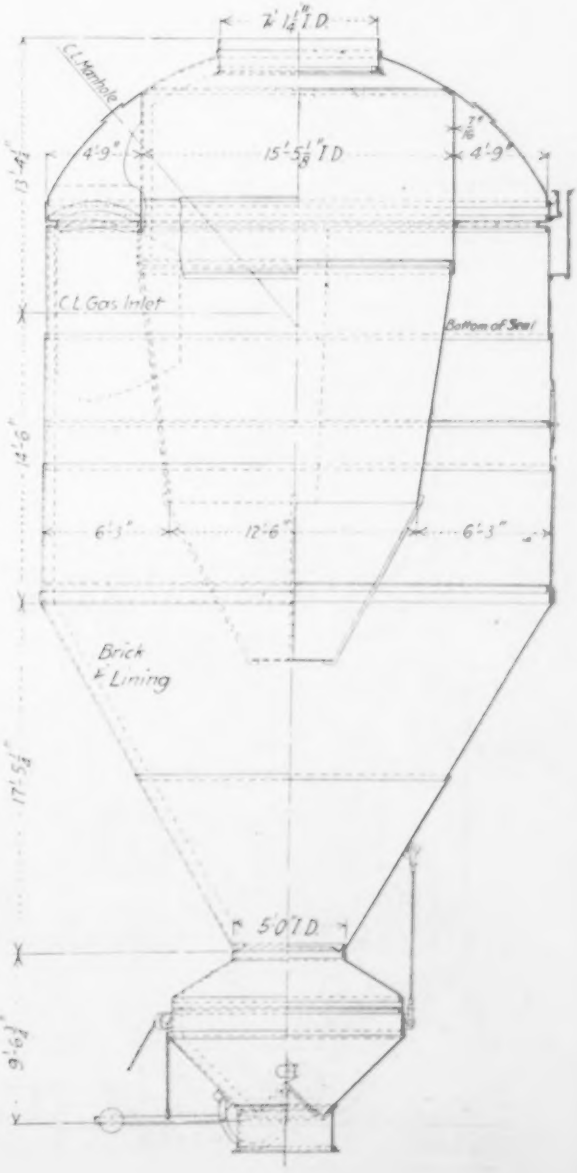
View of Furnaces and Stoves as Taken Sept. 15, 1920, Looking Northeast from the Southwest Corner of the Ore Yard. Concrete-steel unloading trestle at the right



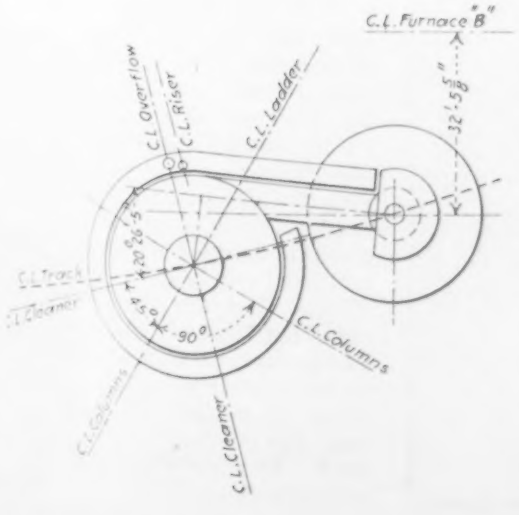


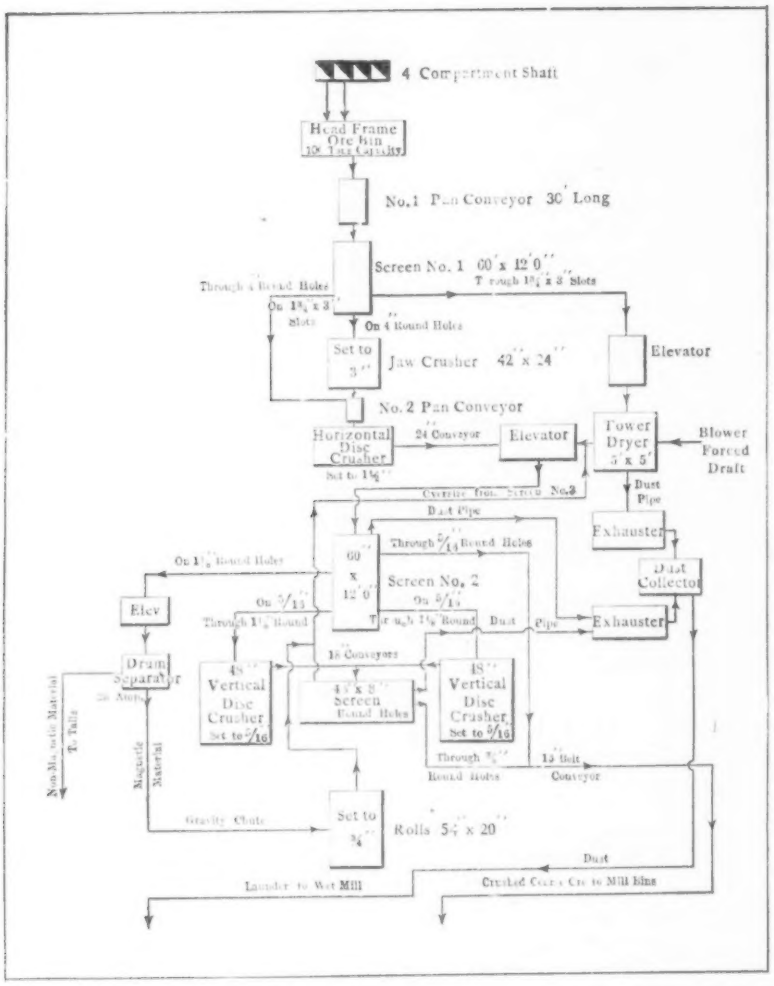
Trestles, Storage Yard, Sintering Plant, Reservoir, Pig Casting Machines, etc.



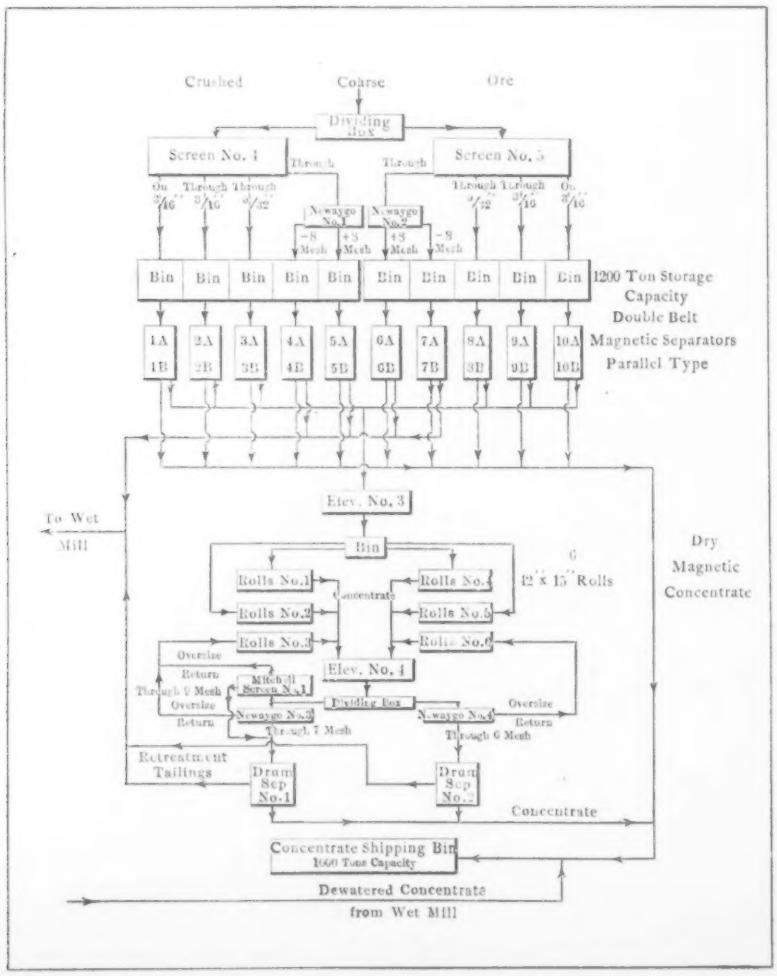


Arrangement of Gas Cleaning Plant. The sectional view on the right shows the construction of the modified Bachman cleaner when operated wet, a central tube being provided from which cleaned gas is taken off





Flow Sheets of Ore Crushing and Dry Concentrating Mills, the Former Above and the Latter Below



trates have been stocked at the furnaces.

The sintering plant now building consists of two double-strand Dwight and Lloyd machines with a capacity of 900 tons of sinter per day. Flue dust, of which there is a considerable accumulation from the operation of the old furnaces, will also be put through the sintering operation. From the Dwight and Lloyd plant the cars of sintered ore will be switched to the trestle track to be stocked, or to the tracks traversing the bin system, if intended for current consumption.

Blast Furnaces

The new furnaces are 90 ft. high, with a diameter of 21 ft. 6 in. at the bosh, 17 ft. 6 in. in the crucible and 16 ft. 10 in. at the stock line. They are rated at 500 tons per day each. In conformity with the latest practice, the bosh angle is 79 deg. 13 min., and in other respects the design is for the most advantageous use of magnetic concentrates. The furnace tops are of the McKee revolving type. Departing from the usual construction, the cylinders operating the bells are on the cast house level. There are steam engines for the skip hoist and instead of being back of the skip incline, as in the old plant, they are located in front of the furnaces.

The furnaces are provided with quick closing valves, so that either can be isolated in case of emergency.

The four Roberts stoves for each furnace are 22x100 ft., of the two-pass type, with side combustion chamber. They are equipped with short flame burners. New cast houses are being built, the floors being raised 7 ft. to accommodate the large new hot metal and cinder cars —three self-dumping hot metal cars of the mixer type with a capacity of 100 tons each and five self-clearing cinder ladles of 330 cu. ft. capacity. Two pig casting machines of the mold conveyor type are being installed.

Gas Washer

From the furnace top there are four gas outlets leading into the downcomer. The construction of the dust catcher and gas cleaner and their arrangement are shown in the accompanying drawings. The gas cleaner is a modification of the Bachman type and can be operated wet or dry. It is of similar shell construction to that of the dust catcher and is of the same diameter, namely 25 ft. For wet cleaning the construction has some unique features. The gases come from the dust catcher to the cleaner on a tangent and impinge on a sheet of water flowing over the surface of the cylindrical shell. The dirt taken up by the water is trapped off at the bottom

of the chamber. The central tube, to which the cleaned gas passes and from which it is taken off, is 11 ft. 4 in. high and narrows from a diameter of 15 ft. 6 in. at the top to 12 ft. 6 in. at the bottom.

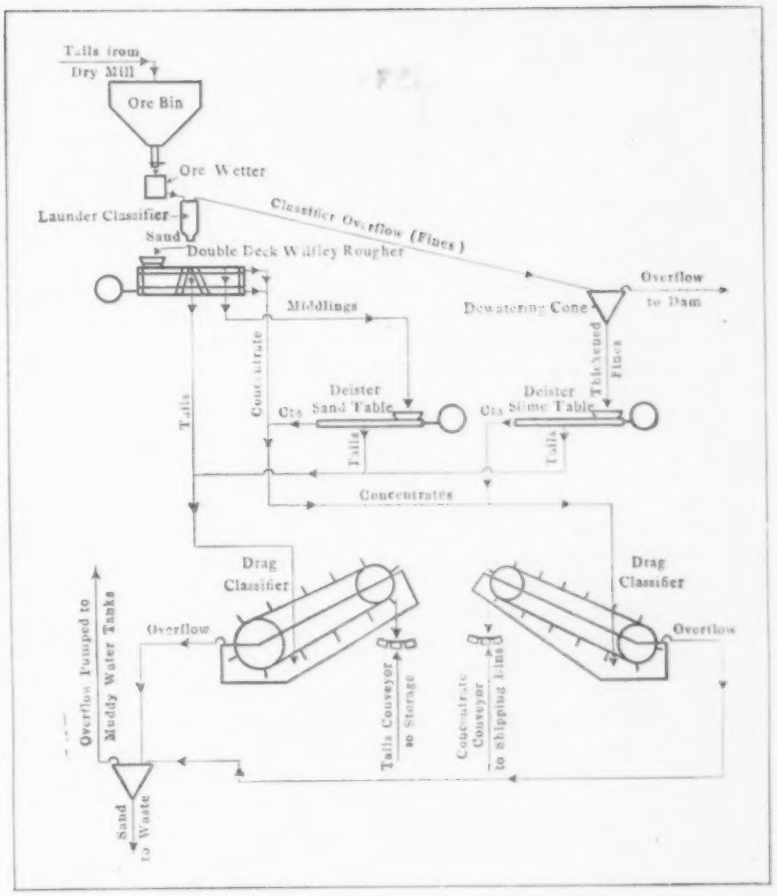
Power Plant

There are 20 350-hp. Stirling boilers, all of which are being repiped and reset and equipped with short flame burners. Throughout the plant all steam lines are being repiped. The blowing equipment consists of six Southwark horizontal cross compound engines, fitted with plate valves, with capacity of 100,000 cu. ft. of free air per minute. To supply the additional power needed for the ore bridge and the sintering plant, a 1000-kw. generator direct connected to a Corliss cross-compound engine is being provided. The pumping equipment consists of three 1,500,000-gal. and one 1,000,000-gal. pumps. The reservoir from which is drawn the furnace water supply is fed by a tunnel from the company's Hurd mine, the water being the overflow from that property.

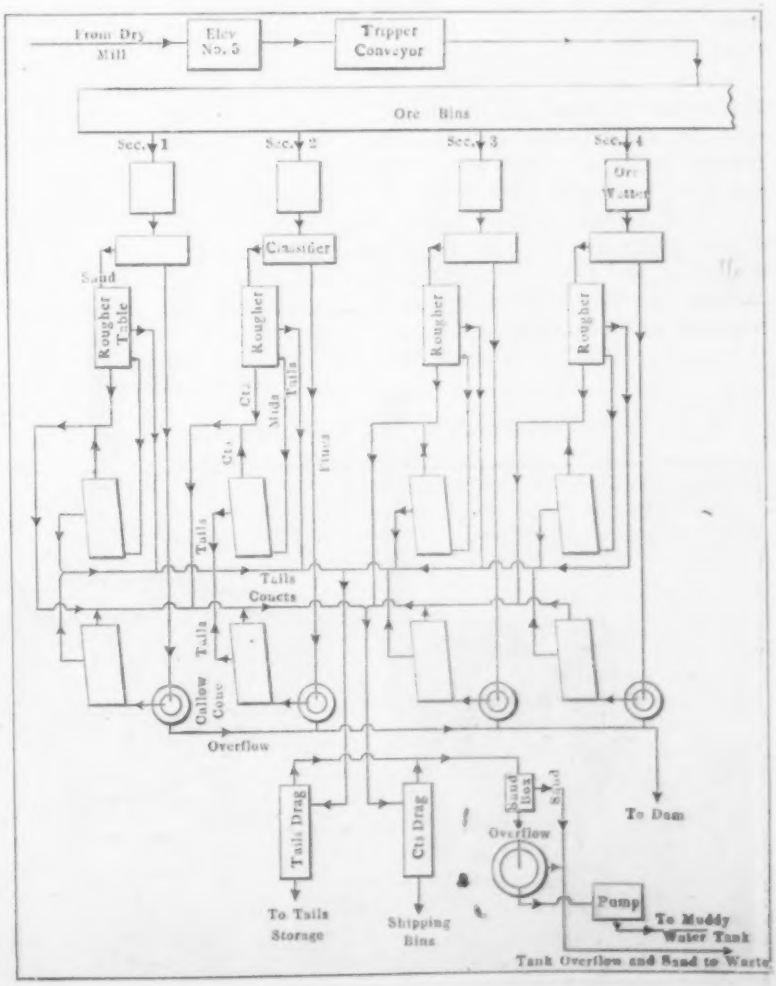
An expenditure of $100,000 is being made at the company's limestone quarry at Ogdensburg, N. J., about 20 miles distant from the furnaces.

The Replogle Mine

The Wharton Steel Co. owns in fee simple 5000 acres of mineral lands covering an ore zone of 12 miles in extent from the Hibernia mine on the north to the Dickerson mine on the south, representing some 29 mining properties in addition to mining rights to further extensive acreage. The Hibernia mine, which was the chief source of supply of the original Wharton Steel Co., produced ore for the forges of Revolutionary times. Its total output has been about 6,000,000 tons of ore from an unbroken shoot 8500 lineal ft. in extent and mining has been carried on for a depth of 1400 ft. It is expected that the Hibernia mine will be reopened at an early date. At present the mine in active operation is known as the Replogle, located but 1.3 miles from the blast furnace plant. It was formerly known as the Scrub Oaks. This mine, while worked for a good many years in a small way by a series of shallow shafts, open pits and surface excavations, has been idle from 1881 until the summer of 1917. At that time the Wharton Steel Co. began further exploration and in the interval the property has been diamond drilled for a lineal extent of 8000 ft. to a maximum depth of 1250 ft. The ore occurs in a large lens which strikes north 33 deg. east, dips 55 deg. southeast and pitches 18 deg. to the northeast. The holes put down on the property have shown ore at a greater depth than has been proved



Flow Sheet of Wet Concentrating Mill. Vertical arrangement shown above and horizontal arrangement below



elsewhere. The work done since the present owners acquired the property has indicated the existence of 27,000,000 tons of ore. In reporting on these mines in 1919 the late James Gayley expressed the opinion that "the Wharton properties contain 100,000,000 tons of ore as of to-day" and added that "no one knows what the ore range will ultimately produce as mining progresses from horizon to horizon at greater depth and with a possible enrichment as depth increases."

Mining is carried on by overhand shrinkage stoping, the ore being drawn into cars in chute holes 40 ft. apart. Access to the stopes, which in places reach a width of 100 ft., is gained through protected manway raises. The chute raises are connected by inclined raises, leaving wedge shaped pillars protecting the 7 x 9 drift. Protected manway raises are driven at 400 ft. intervals.

All ore is now hoisted through No. 1 shaft, which has four compartments, 6 x 6-ft. each in the clear. The development of shaft No. 2 has recently reached the second level, 500 ft. down, at which point the two shafts are being connected. The equipment at No. 1 shaft is being replaced by a new double-drum electric hoist, handling 5-ton skips in balance, with a rope speed of 800 ft. per minute, giving a capacity of 150 to 200 tons per hour. A new single drum d.c. hoist will serve the third compartment, handling a man car with a capacity of 20 men. This equipment also handles supplies, leaving the skip compartments for the hoisting of ore only.

At the first level, 232 ft. down, the mine has been opened by a drift 2500 ft. in length, equipped with electric haulage, battery-type locomotive, handling 10 car trains for which side dump cars of 5-tons capacity have been ordered to replace the 2½-ton cars which dump into a 400-ton ore pocket 90 ft. below the level. From this pocket the ore flows directly into 5-ton skips, dumping into an ore bin at the headframe above the crushing plant.

At the second level, 500 ft., a 30 x 42-in. motor driven jaw crusher will be installed in order to feed into the shaft pocket material crushed to 8-in. size before hoisting. This will obviate the expense of sub-level work and block holing to a great extent.

Other deposits will be opened to give the variety of ores necessary to make Bessemer, basic, foundry, malleable and low-phosphorus irons, and additional milling facilities will be added so as to double the present ore production.

Concentrating Plant

In the fall of 1918 a crushing and a dry concentrating plant were built at the Replogle mine. This year a wet mill in eight units was added. By referring to the accompanying flow sheets the ore can be traced to the crushing plant, magnetic mill and wet mill. For dry concentration Ball-Norton mills are used. About 30 per cent of the iron content of the ore is recovered by the wet mill, and its construction was decided upon in view of the intermingling of a certain amount of non-magnetic ore in the deposit.

The present production at the Replogle mine is about 900 tons of crude ore per day (two 8-hour shifts) and with a ratio of concentration of 2 to 1 there is an output of about 450 tons of concentrates per day. With the installation of a new pump system now about completed for water return, it is expected that the mine production will be increased to 2000 tons of crude ore per day, giving 1000 tons of 60 per cent iron concentrate.

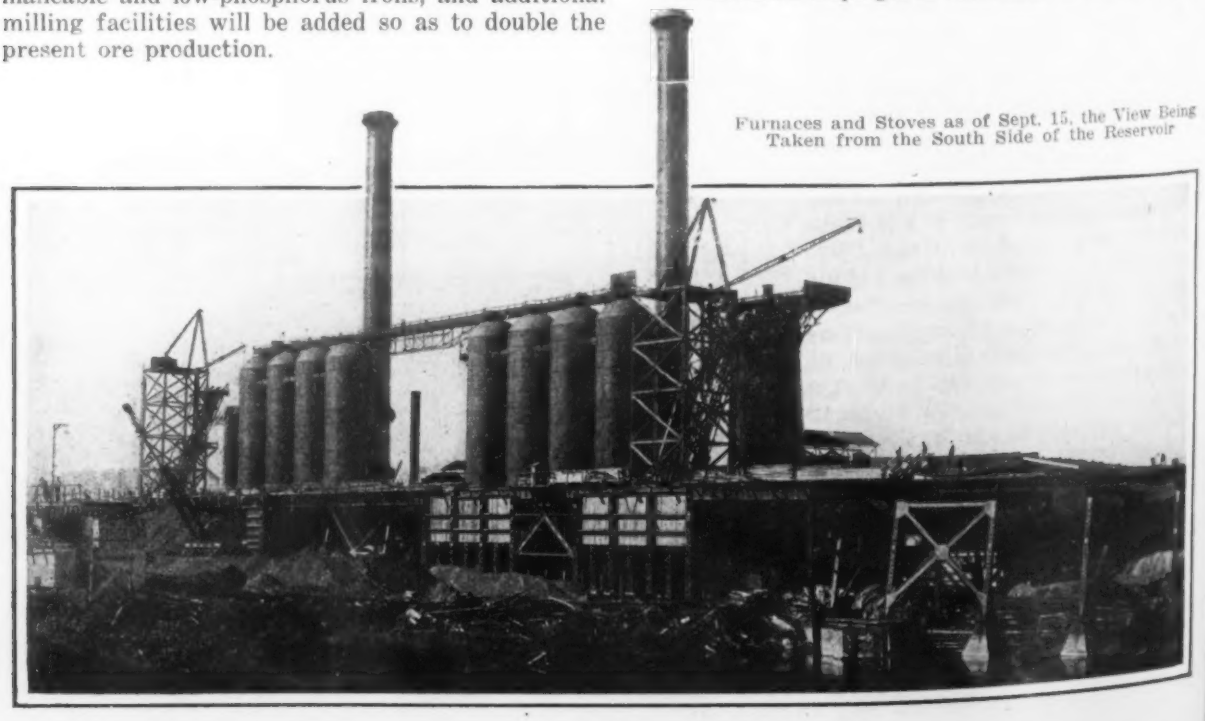
The crude ore averages 36 per cent iron. The concentrates produced in the first eight months of 1920 have averaged 60.18 per cent metallic iron, 13.20 per cent silica and 0.032 per cent phosphorus.

Wharton & Northern Railroad

The railroad of the company, the Wharton & Northern, is a common carrier, having 23½ miles of main track extending from Wharton to Green Pond Junction, N. J. This road serves the army and navy arsenal at Picatinny and also has an extensive cross-over business in raw material with three important lines. It connects at Wharton with the D., L. & W. Railroad, at Wharton and Lake Junction with the Central Railroad of New Jersey and at Green Pond Junction with the Erie Railroad. There is also a trackage agreement with the Central Railroad of New Jersey for the operation of trains between Lake Junction and Hopatcong Junction and in this way the blast furnaces are connected with the Replogle mine. Included in the equipment of the Wharton & Northern are 10 locomotives, 22 steel ore cars of 100,000 lb. capacity, 3 pan cars, 1 caboose and 2 flat cars. The road has under rental 30 automatic side dump cars.

Personnel

J. Leonard Replogle is chairman of the board of



Furnaces and Stoves as of Sept. 15, the View Being Taken from the South Side of the Reservoir

directors of the Replogle Steel Co., and W. H. Brevoort is president of the Replogle Steel Co. and of the Wharton Steel Co. L. P. Ross is vice-president of the Wharton Steel Co., in charge of blast furnace construction and operation. H. J. Briney is furnace superintendent. A. B. Menefee is superintendent of mines. Pilling & Crane, Philadelphia, have been appointed selling agents for the furnace product, which will consist principally of steel-making and foundry irons.

The present expectation is to have the first of the new furnaces in operation by Dec. 15, 1920, and the second will probably follow early in the new year.

BRASS FOUNDRY MOLDING

Molding Machines Used for Jobbing Work by Vickers, Ltd.

Molding machinery for jobbing work is successfully used in the brass foundry of Vickers, Ltd., Barrow-in-Furness, England, according to H. B. Weeks in a paper read before the recent meeting of the Institute of Metals. The output of jobbing work treated in molding machines has been, he says, 75 per cent higher than when made on the floor.

The pattern plate is provided with means for indicating the correct position that each pattern is to occupy thereon, such as a series of openings or dowel holes. The dowel holes may have index numbers and be located at predetermined distances part over the surfaces of the pattern plate. The patterns may be provided with means for indicating the correct position which they are to occupy on the pattern plate, such as two or more openings or dowel holes for receiving the dowel pins which secure the patterns in position on the pattern plate.

Patent rights for this pattern plate were taken out some time ago by Vickers, Ltd.

In the Vickers brass foundry about 80 tons of brass castings were turned out per week. From August, 1914, to November, 1918, two million brass castings were shipped. Some idea of the proportions of the company's war program may be realized by the statement that at one period well over 1200 castings were shipped each day for seven days a week.

The metal-melting plant consists of two 7-ton and on 5-ton reverberatory furnaces, and 44 crucible fires, the total capacity being 42 tons per day metal output.

The furnaces are charged in part with briquets, which are compressed by hydraulic pressure, and which are composed of turnings and borings of every description and form of brass.

Among special alloys was a "high-strength brass" of the 60:40 type containing 2 per cent of nickel and about 3 per cent of manganese, formerly called manganese bronze. The tests from sand-castings gave 15 tons (33,500 lb.) per sq. in. yield, 32-36 tons (71,500 to 80,500 lb.) per sq. in. tensile with not less than 15 per cent elongation on 2 in. This material was somewhat pale in color, however, which was the cause of further experiments being made to produce a bronze of richer tone. Although this was successfully accomplished, it became increasingly difficult to meet the Government demands for higher strength and yield point without resorting to artificial cooling of the test-bar.

Recognizing that such tests did not represent any portion of the casting, other mixtures were experimented with until one was obtained which fulfilled all the Admiralty requirements from a bar cut from any part of the casting. There is now no difficulty, Mr. Weeks claimed, in obtaining from such a casting 20 tons per sq. in. yield, 40 tons per sq. in. ultimate tensile, and 20 per cent elongation on 2 in.

Another special alloy manufactured, known as Vickers Crown metal, which has the appearance of German silver, has been found of value in cases where resistance to corrosion is essential. This also has a yield of 20 tons per sq. in., an ultimate tensile of not less than 35 tons per sq. in., with about 10 per cent elongation on 2 in. This proved of utmost service for parts of submarines and their engine fittings.

The quantity of castings made during the five years covering the war period was as follows:

Total output of castings from brass foundry, 16,886 gross tons; largest casting 23½ gross tons; smallest casting, 1 oz.; total average of rejections for the five years, 3 per cent.

Survey of Scrap Exporting

A survey of iron and steel scrap conditions in Great Britain, France, Switzerland and Italy has been made by M. L. Tyroler, New York district manager Luria Brothers & Co., Woolworth Building, New York, who returned on the Aquitania on Sept. 17. He is impressed particularly by the difficulty for Americans of carrying on export business at this time. A few months ago Great Britain consumers purchased much heavy melting steel from American brokers. Since then the market price has declined considerably, both here and in England, with the result that British purchasers are disappointed with their contracts and are taking many means to avoid and cancel them. Accordingly they are rejecting shipments on the least provocation. A half dozen American brokers have recently canvassed the foreign fields and have been so active as to cause a certain amount of jealousy and ill feeling on the part of local brokers and dealers. The condition of foreign exchange is another detriment to scrap exports.

France is not allowing its scrap to be shipped out of the country. Much war scrap still remains ungathered, Mr. Tyroler having seen miles of military barbed wire still standing on the battlefields. Industrially, Great Britain is much better off than France. In the latter country, the fuel shortage is evident on every hand. The main streets of Paris are lighted most dingily and store windows are in darkness. The trains in France are heavily loaded with the less cultured classes, made well-to-do by the war industries, and because of the crowded conditions are very insanitary.

Owners of Steel Common

There now are 90,952 persons who own United States Steel common stock, according to the totals made up by the transfer office on the closing of the books Aug. 30 for the last quarterly dividend. This is a new high record as compared with 87,229 stockholders as shown by the books in June last. The average holding of the stock is less than 56 shares. The number of Steel common stockholders has doubled in the last three years. The majority hold the stock purely for investment.

New Temperature Conversion Chart

Sauveur & Boylston, Cambridge, Mass., has issued a temperature conversion table by Prof. Albert Sauveur which has several unique features which render it convenient and practical. It is printed in two colors which facilitate the reading of Centigrade or Fahrenheit figures.

The August income of the Steel & Tube Co. of America was $1,420,598, the net income was $974,373, and the surplus for depreciation and common stock, $872,289. Net earnings for the eight months ended Aug. 31 last were $7,266,914, which, after allowing for the preferred dividend requirements, is equal to $6.64 per share on the common stock.

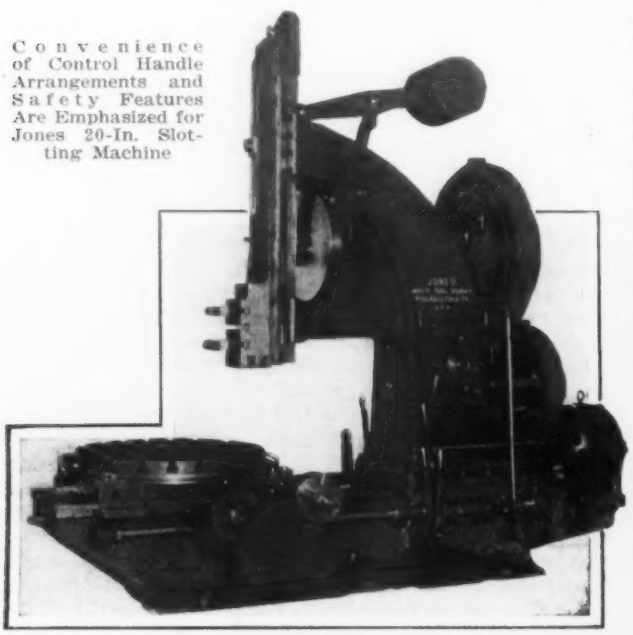
According to present plans, the Chicago Pneumatic Tool Co. will have no funded debt after Oct. 1, bondholders having been notified that the issues maturing in 1921 and 1922 will be anticipated.

After making the usual deductions for taxes, depreciation, etc., the Gulf States Steel Co. showed net earnings of $92,482 in August, as against $98,040 in July.

New 20-in. Slotting Machine

A slotting machine designed with a view to meet the modern practice with the use of high speed tool steels has recently been placed on the market by the Jones Machine Tool Works, Media and Edgewood streets, West Philadelphia. The construction and proportions are such as to provide for the machining of heavy work. The machine is made with single pulley drive and is furnished with two speed countershaft or direct connected to a constant or variable speed motor of 10 hp. It has four change speeds, ranging from 8 to 16 strokes per min. for constant speed motor and 8 to 42 strokes per min. for variable speed motor or two speed countershaft.

Drive is by a friction clutch, and there is a brake for stopping the ram. The clutch, which is engaged by a handle, can be operated from either side of the machine, and drives the change speed shaft, whereon are mounted four steel sliding gears. These gears are



Convenience of Control Handle Arrangements and Safety Features Are Emphasized for Jones 20-In. Slotting Machine

brought into engagement with steel gears on the driving shaft by hand lever. Mounted on the end of the driving shaft is a steel pinion which engages the bull gear wherein the quick return mechanism is mounted, which is flooded with oil. The ram and crank drive mechanism follow the customary design with the exception of improvements in the link connecting the counterweight and ram.

The feeds for the saddle, cross-slide and circular table, are of the customary intermittent ratchet feed type, and a studied attempt has been made to put all the operation handles within easy reach of the operator. For convenience these handles are duplicated on the opposite side of the machine.

Of the two lower handles shown in the accompanying illustration, one starts and stops the feeds on the saddle and the other operates the clutch starting and stopping the feed on the cross-slide and circular table. The location of these handles, it is pointed out, makes it possible to start and stop the feeds instantly.

A quick traverse by power for the saddle cross-slide and circular table has been incorporated. The gears accomplishing this are driven by a belt from the main clutch shaft and are located in a traverse gear box, located in line with the main feed shaft. The main clutch for operating the ram does not have to be thrown in to operate the quick traverse. It is pointed out that the use of a belt for driving the quick traverse box provides for safety in case the saddle, cross-slide, or circular table should come in contact with any obstruction or to the end of their respective travels.

To rotate the feed shaft it is necessary to hold the operating handle in a forward or reverse position as it becomes neutral when released.

The cross-slide feed screw and circular table worm shaft have small toothed clutches which are operated by handle so that when one clutch is in working position the other clutch becomes idle, making it impossible to engage both clutches simultaneously.

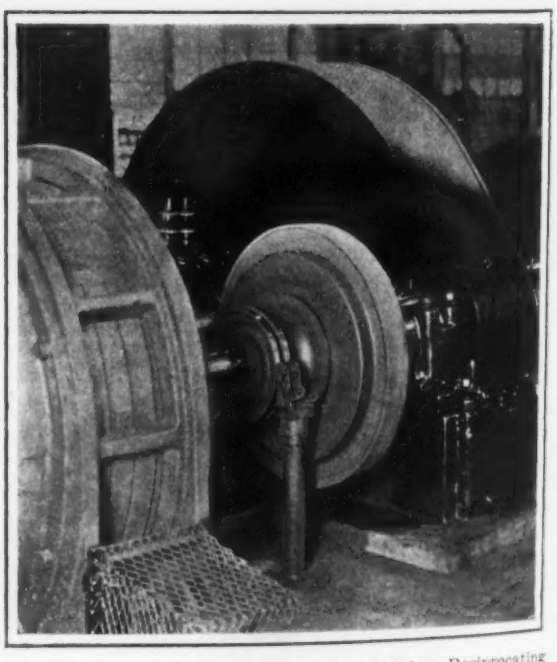
The circular table is graduated on its periphery and is equipped with an indexing mechanism. The latter is of advantage to the operator for accurately spacing the teeth on large gears or any other work that would require spacing to any angle or fraction thereof.

Synchronous Motor Drives Pump Through Magnetic Clutch

Synchronous motors are in use by steel mills, foundries and iron works for driving pumps, fans, compressors and other loads requiring a constant speed and necessitating infrequent starting and stopping.

Because of its low starting torque this type of motor must be brought up to speed before it is connected to the load. After the motor reaches synchronous speed a clutch between the motor and the load is engaged, thus bringing the pump or fan up to speed.

The illustration shows a synchronous motor installation in the Petroleum Iron Works, Sharon, Pa. The motor is rated at 150 hp. and receives power from a 2200-volt 3-phase supply line. A reciprocating pump for an accumulator comprises the load, and is driven by the motor through a reduction gear. On the armature shaft of the motor is installed a Cutler Hammer magnetic clutch, which consists of a circular armature member and a field member, a small air gap separating the two. Each member is carried on a spring steel plate, which holds the friction faces out of engagement until the clutch is magnetized. Upon the passage of current through the winding of the field member, the armature is attracted to it, engaging the friction surfaces. This is accomplished through the flexibility of the spring steel plates, there being no sliding of the clutch parts along the shaft.



Magnetic Clutch on 150-Hp. Motor Driving Reciprocating Pump for an Accumulator

The clutch shown in the illustration is 30 in. in diameter and has a maximum torque of 2410 lb. at 1 ft. radius. The energizing current required for the clutch is so small that it may be taken from the exciter of the motor, or from any other direct current source.

Meeting of National Founders' Association

The twenty-fourth annual convention of the National Founders' Association will be held in the Hotel Astor, New York, Wednesday and Thursday, Nov. 17 and 18.

American Electrochemical Society

The Self-Baking Electrode in America—Electric Furnace Problems Discussed at Fall Meeting in Cleveland—Montana Electric Ferromanganese

VARIOUS matters of interest to the steel industry, particularly in reference to the electric furnace, were discussed at the thirty-eighth general meeting of the American Electrochemical Society, held in Cleveland Sept. 30 to Oct. 2. During the three days' meeting, the mornings were devoted to technical sessions and afternoons to visits to various industrial plants. The opening and closing technical sessions were held at the Statler Hotel and Friday's session at Case School of Applied Science.

During the business sessions it was announced that a referendum vote on the adoption of the metric system as the exclusive system of weights and measures in this country showed that 484 members favored this system and 105 were opposed to it. Atlantic City was chosen as the place for holding the Spring meeting in 1921. Should the society be unable to make suitable arrangements for a meeting there, Hot Springs, Va., was named as second choice. An expression of sentiment was taken from the members in regard to joining the recently organized Federation of American Engineering Societies and those in favor were in a slight minority.

Heat Losses Through Electrodes

Prof. Joseph W. Richards of Lehigh University, secretary of the society, presented a paper on "Heat Losses Through Electrodes of a Six-Ton Heroult Furnace," covering work done under his direction, the paper being prepared by M. R. Wolfe and V. de Wysocki, of Lehigh University. The furnace investigated was one at the plant of William J. Wharton, Jr., & Co., near Easton, Pa., and the problem undertaken was to determine the heat loss of electrodes under actual working conditions. To measure the temperature a thermocouple of nickel and iron wire was used, the end being twisted and fused together and connected with the voltmeter. The furnace had three electrodes, each 38 centimeters in diameter, and each was provided with a water-cooled ring immediately above its exit through the roof of the furnace and also with a water-cooled connection at varying distances above the roof of the furnace. Tests of these electrodes determining the amount of water supplied to each, and its rise in temperature, made it possible to calculate the electric energy represented by the heat in cooling water used by each electrode. The total heat in the cooling water for the furnace was shown to be 123.1 kw., and as 650 kw. was supplied for the furnace, the total electrode loss was 18.7 per cent of the power used.

This paper brought out considerable discussion. F. A. J. FitzGerald, FitzGerald Laboratories, Niagara Falls, N. Y., asked if it was fair to call the losses that were measured entirely electrode losses, and expressed the belief that a certain amount of the heat that was lost was undoubtdly coming by induction through the roof and not from the electrode, and should not be called electrode losses. Dr. Carl Hering, consulting engineer, Philadelphia, expressed regret that further data were not supplied that would permit of making deductions for electrodes in other sizes. He stated that the electrodes projected considerably above the upper water cooling ring and that unless that ring cools the electrode to the temperature of the air there will be further loss above the upper ring, which is not accounted for in the results. Consequently, the loss might be greater than 18.7 per cent. Robert Turnbull, consulting engineer, Welland, Ont., stated that the cooling rings were intended to cool the roof and not the electrodes and that the main losses in temperature come from the roof rather than from the electrodes, only about one-fourth of the temperature loss being from the electrode. He thought the paper would be better named were it called "Losses Caused by Passing of Heat Through the Roof of an Electric Furnace," because if the electrode did not come through the roof there would be no losses. Professor Richards remarked that the cooling losses were losses on the rings and not on the electrodes themselves.

Heat Content in Electric Steel and Slag

"The Heat Content of Steel and Slag from an Electric Furnace" was the subject of a paper prepared by A. M. Kuhlmann and A. D. Spillman and submitted by Professor Richards. Calorimetric determinations of the heat contained in liquid steel and liquid slag were made in connection with a 6-ton Heroult furnace making steel castings. The calorimeter was a galvanized iron bucket insulated on the outside with a single layer of asbestos. For measuring the temperatures a Fery radiation pyrometer was used for the high temperatures and either a platinum-iridium thermocouple or a platinum resistance pyrometer for the lower temperatures.

In discussing this paper Dr. Hering said that if molten steel is dropped in water there is a lot of steam generated which is a setting free of latent heat. Consequently he thought there would be considerable error in using a water calorimeter for such high temperature material. He suggested that it would be better to use a crucible of lead in the calorimeter and pour the molten steel into the lead and then measure the total heat absorbed, first in the lead and then in the water. Walter S. Landis, American Cyanamid Co., New York, the chairman, said that there were a number of things in the paper that would require clearing up. Some of these were questions of temperature. He noticed that a radiation pyrometer was used for measuring the high temperature and said that this type of pyrometer is usually sufficient around a steel plant but when it comes to scientific data it has many corrections which render its readings doubtful for exact work. Professor Richards said he had made tests which showed that the heat loss from pouring slag into water is small, but thought the temperatures given of slag in a solid state were too low and said this belief was confirmed by the fact that other data in the report showed 476 and 520.5 cal. were found in the slag in a liquid state.

Specialized Refractories

"The Physical Characteristics of Specialized Refractories" was the subject of a paper prepared by M. A. Hartmann, director of the research laboratory of the Carborundum Co., Niagara Falls, N. Y., and by A. P. Sullivan and D. E. Allen, research chemists of that company. This paper brought out the results of tests of the electrical resistivities of nine commercially used refractory materials at temperatures up to 1500 deg. C. Measurements were taken while heating up slowly and while cooling down slowly, the thermocouple measuring the temperature being outside the specimens. The amount of temperature lag thus involved was approximately determined. It was pointed out that the results are necessarily only approximate, but show the relative resistivities of the different materials and the general order of magnitude of their resistivities up to 1500 deg. C. The refractories test included silica, chrome, magnesia, and fire clay bricks.

In a discussion of this paper, Mr. FitzGerald said that the data obtained was valuable to furnace men, if reliable. Dr. C. G. Finck, New York, asked Mr. Hartmann if he had made a chemical analysis of the brick. He declared the paper was a valuable one and an important opening wedge to a very vital subject. Mr.

Landis also said the paper introduced an important topic, but remarked that very different results would be obtained from tests of refractories that had been used for a week or two, as compared with new brick. Another speaker regretted that only one specimen of each kind of refractory had been taken and hoped that the writers of the paper would continue their work, using other specimens. It was also suggested that the society appoint a committee to outline data to be secured, as this would enhance the value of work along this line. Professor Richards said that from materials available results can be secured, but not general laws. Value would be added to the investigation were analyses of the brick given. He declared that what was most desired was the final resistivities of refractories. He would take the samples and use them a week and get final results that would be applicable to the furnace in its operating condition.

Nickel Resistors

F. A. J. FitzGerald and Grant C. Moyer, FitzGerald Laboratories, presented a paper on "Deterioration of Nickel Resistors." This included a record of attempts to use pure nickel wire as a furnace resistor in place of nichrome wire. The nickel wire was found to have become brittle and to break easily. The cause of this was found to be the absorption of sulphur. It was stated that when sulphur was absent from materials with which the wire is in contact and from the atmosphere of the furnace, pure nickel wire is a good substitute for nichrome resistors. During a brief discussion of this paper it was stated that the brittleness of the nickel may be overcome by the addition of under 3 per cent chromium, and that the addition of manganese and some other metals has the same general effect.

Söderberg Self-Baking Electrode

Considerable interest was taken in a paper on "The Söderberg Electrode; First American Installation," by Professor Richards. This included a description of a 3-phase installation of the Söderberg continuous self-baking electrodes 32 in. in diameter, that have been used since July 2 in an 1800 kw. electric furnace in making ferromanganese at the Anniston, Ala., plant of the Southern Manganese Corporation, being introduced into this country from Norway. Professor Richards said that the results of the operation of this furnace prove various advantages of the Söderberg electrode, including continuity of operation as far as the electrodes are concerned, smaller consumption of electrode carbon per given power supplied to the furnace, lower cost of electrode, lower power losses in the electrodes and greater regularity of running the furnace.

The Söderberg electrode was introduced into this country at the Anniston plant by "Elektrokemisk Industri" of Christiania, Norway, and referring to this installation Professor Richards said: "Theodore Swann, president of the Southern Manganese Corporation, has recognized the great possibilities of this electrode and has become the pioneer of its introduction into America. Other electric furnace plants will undoubtedly quickly follow his lead as soon as their managers realize the great advance which it marks in electric furnace operation." A description of a Norwegian installation was published in THE IRON AGE, April 22, 1920.

Professor Richards supplied some late data regarding the operation of the furnace not contained in his paper. He said that during 28 days in August the furnace was shut down only 13 min. on account of the electrodes themselves. The consumption of carbon during that period was 14.02 lb. per 1000 kw. hr., and the cost was 4.012c. per lb. of electrode, including the license. The cost, he said, would be reduced when this electrode is used in other furnaces in the plant.

Mr. Turnbull, in the discussion, said that he had made a test of American electrodes, putting three electrodes on a single phase and found that the electrode consumption was 11.06 lb. per 1000 hw. hr. He declared he would not use the Söderberg electrode until further convinced of its advantage. A question was raised as to the resistivity of this electrode. Mr. Landis replied that the current was carried in a cast-iron jacket and the resistivity made no difference. Mr. Landis regretted that the first installation of these electrodes had been made in the South, so far away from other electric furnace installations, and that it had been placed in a furnace that is hardly typical of electric furnace work, and, consequently, he believed it would take a long time to get very definite results from this furnace.

Professor Richards believed that the savings from the use of Söderberg electrodes would be one-half as compared with the baked electrode. Further along the discussion he stated that he had just received word that this electrode has recently been placed in use in a Heroult tilting type furnace in the Stavanger Steel Works, in Norway and that the electrode was proving so successful that the plant intends to use them in all of its furnaces. He presumed that a spare electrode is provided and that this is used when one of the other electrodes has to be taken out to be lengthened and that the old electrode is placed in sand and a new section of casing is welded on and the electrode mixture is then tapped in. He believed this plan would work out successfully in electric furnace practice and would dispel any misgivings that might be had as to the use of this electrode in tilting type furnaces for the melting of steel. At the Anniston plant he said the electrode was lowered into the furnace with the current on. At this plant there had only been one slip in lowering the electrode and that was when the workmen were showing some new employees how to handle it and eased up too far on the screws and allowed the electrode to slip into the furnace.

Electric Ferromanganese in Montana

A paper prepared by E. S. Bardwell, metallurgist, Anaconda Copper Mining Co., on "Electric Smelting of Montana Manganese Ores" was submitted. The author described the electric furnace plant built by his company in 1918, their electrode holders and the operations of the furnaces.

Effect of Certain Metals on Corrosion

E. A. Richardson and L. T. Richardson, National Lamp Works, General Electric Co., Cleveland, presented a paper on "The Influence of Copper, Manganese and Chromium and Some of Their Combinations on the Atmospheric Corrosion of Iron and Steel." Various tests were referred to and the conclusions reached were summarized as follows:

> There is a mutual action between manganese and copper in their effect upon the atmospheric corrosion of iron. Copper alone reduces the corrosion of pure iron and to a still greater extent the corrosion of steel. This is due to the effect of manganese, which enhances the effect of copper.
>
> If manganese is replaced by chromium the effect is still more pronounced.
>
> The red-short range in iron due to the presence of copper is removed by either manganese or chromium.
>
> It is believed that there is some relation between this red-short range and resistance to atmospheric corrosion. Based upon this the film inter-grain hypothesis is suggested to explain the corrosion resistance of these alloys.

James A. Aupperle, American Rolling Mill Co., Middletown, Ohio, in a discussion in this paper said that the authors had made the broad statement that the presence of 0.04 per cent copper in pure iron causes it to be red-short. This, he said, was contrary to his experience after long research work on the effect of copper on red-shortness. He had found that if the sulphur is low enough, even 0.50 per cent copper will not cause metal to be red-short if the sulphur is below 0.01 per cent, even when the manganese is below 0.02 per cent. Various tests his company has made showed that up to 0.50 per cent chromium this element increases the rate of atmospheric corrosion, while with very large percentages of chromium up to 35 per cent, the conditions are reversed and practically no corrosion occurs in such alloys.

The same remarks applied to the effect of silicon on steel. The small percentages up to 0.50 per cent increase the atmospheric corrosion whereas where the metal contains up to 15 per cent silicon it is practically rust proof. Mr. Aupperle declared that such sweeping conclusions the authors had made should not be drawn

from atmospheric tests without taking into consideration the many tests that have been made under other conditions. Very little iron or steel, especially sheet metal was used without giving it some protective coating. While a galvanized coat on pure iron will last many years all bare grades of iron and steel sheets with or without copper have failed in the Pittsburgh district within three years. He confirmed the statement of F. L. Speller, metallurgist, National Tube Co. about the effect of copper not being beneficial where water predominates.

He said he would also go further and say that copper is absolutely harmful where water predominates especially if the water contains either alkalies or sulphates.

William D. Richardson, chief chemist Swift & Co., Chicago, in a paper entitled "The Solution of Metals in Acid as related to Corrosion" discussed this subject at considerable length. He said that it has been realized that there must be a rather intimate relation between the phenomena of solution of metals in acids and corrosion itself and numerous attempts have been made to develop a so-called accelerated corrosion test in acids, particularly for various kinds of iron and steel, which would run parallel to actual corrosion tests under the service conditions for the respective metals. However, all such attempts have proved failures. The course of corrosion has been found to be different from that of solution in acids so that the latter can not be made to serve as an index of the former. Not only do metals dissolve in acids in a different order from what might be expected but they follow a still different order in corrosion. Some of the principal influences which affect the rate of solution were discussed in detail. In conclusion it was pointed out that the inconsistent behavior of the metals in corrosion and acid solution phenomena on the basis of electrochemical series can only be explained by taking into consideration the number of factors. The principal factors are solution tension, the hydrogen influence, the oxygen influence, the carbon dioxide influence, the cathode influence and the halogen influence.

Plant Visitations

Among the plants visited were those of the National Malleable Castings Co., where a 15-ton Heroult furnace is used for refining iron for making malleable castings and the plant of the U. S. Copper Products Co., which uses General Electric and Baily furnaces for the melting of brass. In addition an afternoon was spent in a trip through the Nela Park laboratories of the General Electric Co.

INFRINGEMENT CHARGED

Suit Relating to Ore Washing Device Heard by Federal Court at Duluth

Before Judge W. F. Booth, of the Federal Court, at Duluth, Minn., the case of Alexander McDougall, of that city, against the Oliver Iron Mining Co., demanding accounting and damages amounting to a very large sum, has been heard. There was no jury.

Mr. McDougall is the inventor of an ore washing device that he claims antedates the Greenway "turbo" washer, which was in use at the Coleraine works of the defendant company. He also claims that the turbo is an infringement on his patents, and that the Steel Corporation and Mr. Greenway made use of his designs and plans in formulating and designing the turbo machine. He claims that this infringement was in constant use at the Coleraine works from their construction until the close of the season of 1918, that is for a period of six years, during which time some 12,000,000 tons of concentrates were shipped from the works. He demands $2 per ton of ore treated as damages. He claims that his suit for infringement was filed in December, 1918, and that at the opening of the following season the defendant company ceased the use of the turbo part of its washery, maintaining its turbos merely as log washers, discontinuing the water currents from below.

Oliver Company's Denial

The Oliver company enters a general denial, specifically claiming that there is no infringement and that the basis of the two machines differs fundamentally, and Mr. Greenway and the company both deny that there was any use of the McDougall plans and drawings in the design of the Greenway turbo machine.

Mr. McDougall appeared in court with some of the most prominent patent and common law attorneys of the United States, among them John S. Miller, Nathaniel C. Sears, Horace G. Stone; the defendant was represented by its own patent attorneys from New York, Pittsburgh and Washington, and by its local attorneys in Duluth.

The McDougall device consists essentially of a long inclined trough at the upper end of which is introduced the material to be separated from sand, etc. This material flows down the trough together with a stream of water. A perforated pipe is laid in the bottom of the trough and there are holes in the trough through which material may escape. The operation of this machine is as follows:

When the material to be treated and its attendant water are admitted to the upper end of the trough water under pressure is also passed through the pipe extending along the inside of the trough. This pressure water escapes through the perforations of the pipe and agitates the material, causing its lighter portions to separate from the heavier; and the heavier material drops out through the several holes in the bottom of the trough provided for its exit, while the lighter—in this case sand—passes on to the lower, and open end. Thus is the separation effected. The turbo washer, on the other hand, is a modified form of the old time log washer, patents on some forms of which were taken out about 70 years ago, and which had been in common use many years prior to that date. The turbo is an inclined box with the screw conveyor cut into segments to form paddles, such as is common to all log washers, moving the material toward the upper end of the box, instead of the lower, and is equipped with a false bottom, perforated, into which false bottom water is forced under pressure and escapes up into the box, thus assisting the work of disintegration and separation of the material.

Points of Similarity

This false bottom, its perforations, and its water under pressure, apparently are the real points of similarity between the McDougall machine and the turbo. In the arguments of his counsel, McDougall does not admit the value of the paddles either as a disintegrating or moving force, nor does he consider as essential the fact that in the one machine the material is moved up while in the other it blows downward unimpeded.

Whatever the decision of Judge Booth, the case no doubt will pursue its way through the Federal courts to that of last resort, and it will be a long time before it finally is settled.

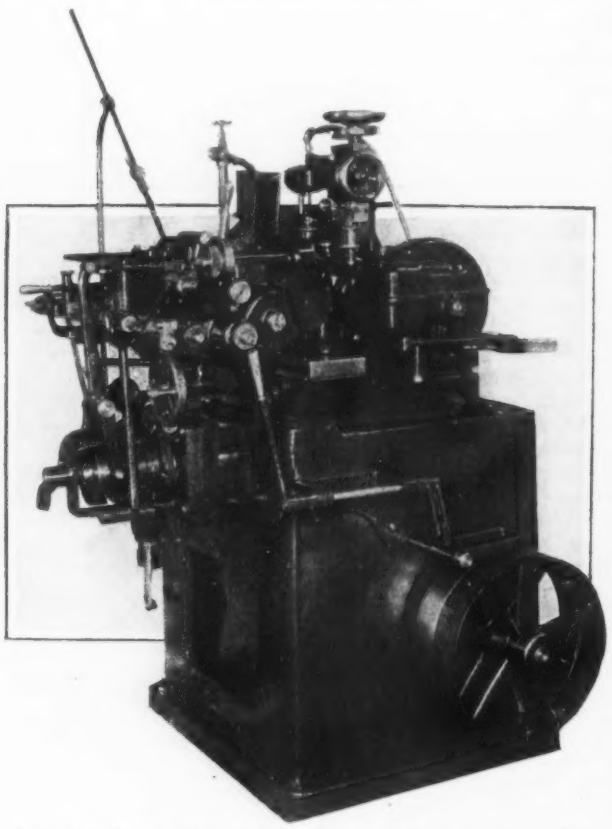
The Hydraulic Steelcraft Co., Cleveland, has been awarded the following contracts: 75 x 290 ft. one story, hydraulic steel building for the Dixie Rubber Co., Memphis, Tenn., saw tooth construction, Lupton steel sash, concrete foundation; 25 x 45 ft. one story, hydraulic steel building for the Philippi Blanket Mills, Philippi, W. Va., Lupton steel sash, concrete foundation; 120 x 460 ft. one story hydraulic steel building for the Peugeot Co. of America, Buffalo, Lupton steel sash, concrete foundation, brick ends, woodblock floor on concrete base.

During the past five years the Railway Steel Spring Co. has eliminated its bonded indebtedness, amounting to $7,000,000, and added $8,000,000 to the working capital.

Automatic Grinding Machine

A full automatic grinding machine for handling rolls and other articles produced in sufficient quantities to warrant automatic grinding is being manufactured by the Warren F. Fraser Co., Westboro, Mass., cylindrical, internal and surface grinding machines.

The outstanding features of the grinder are its rigid construction and the protection of bearings from emery dust, a three-bearing wheelhead and a three-bearing headstock; a live tailstock and a reciprocating wheel spindle, which it is claimed has given better results than a stationary wheel spindle, as it eliminates grinding lines in the work, gives a fine mat finish, and does away with the wheel wearing in grooves.



A Production of 12.2 Rolls, ⅝-in. in Diameter, Ground Per Min. Without Scrap Is Given for the Fraser Automatic Grinding Machine

The wheel dresser is permanently mounted on the wheel head. It consists of a vertical slide, operated by a screw having a hand wheel and a dial graduated to correspond with graduations on the hand wheel used to adjust the wheel slide, upon which is mounted another slide capable of straight or angular adjustment to the grinding wheel. The latter slide carries a diamond for dressing the wheel and is provided with a screw and hand wheel for traversing the diamond across the wheel. The spindles run in bronze boxes, which are adjustable for wear.

The control unit consists of a cam set rotated by a worm and worm wheel. The rotation of the cam set swings the feed arm from the feed pipe to the chuck, holding the piece to be ground until the chuck has closed on one end and the tailstock center has entered the piece. The work then starts rotating and the wheel is quickly brought into contact and then moves at the proper rate of grinding for the required distance. The work is held stationary for a predetermined number of revolutions. The wheel then quickly moves back to the starting position, the rotation of the work is stopped, the jaws of the chuck open, and the tailstock center is moved back, allowing the work to drop out.

The wheel slide is adjusted by a screw having a graduated hand wheel to obtain the correct size for the work being ground and to correct for wheel wear. It is possible for one operator to handle a battery of these grinding machines, provided other help is used to keep the hopper pipes filled.

The initial machines were made for the Bock Bearing Co., Toledo, Ohio. Tests made by that company over a six-hour period showed an average of 12.2 rolls, ⅝ in. diameter, ground per minute without scrap. During that period the wheel was dressed five times and 3489 ground rolls produced, allowance of 20 per cent down time having been made for wheel dressing, setting, etc.

Portable Rotary Pneumatic Grinder

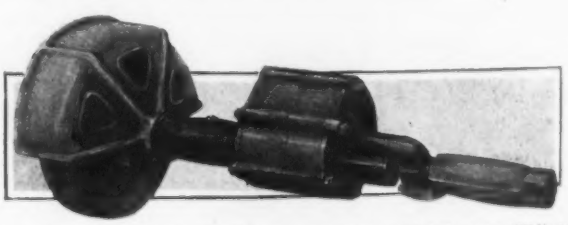
A pneumatic grinder with but three moving parts is announced by the Roto Pneumatic Co., 4700 Train Avenue, Cleveland. The moving parts comprise the pistons, which are rigidly mounted on a straight shaft thus constituting a single rotating member, and two self-sealing sliding valves.

The necessary air enters the machine through the control handle, and is applied to the pistons in the direction in which the shaft rotates, eliminating crankshafts and connecting rods. The turn-handle air control, it is stated, is self-sealing, balanced, and the throttle will stay in any position that it is placed until moved by the operator. It is explained that the control valve will throttle to zero without causing any intermittent jerking and assures even power at the wheel when in operation.

Under average conditions, the grinder is rated to consume 15 to 20 cu. ft. of air per min. under 80 lb. pressure. When heavy duty is required the full power of the machine is at the operator's disposal by further opening of the throttle. The air port areas are large, thus affording full power of the machine when needed. The motor valves automatically release themselves when the air is turned off, thus allowing the motor to idle and slow down gradually. The housing of the motor is bronze and bronze bearings are used throughout.

A safety provision has been made by arranging the air ports to prevent the grinder from running at a speed which would be sufficient to explode the wheel. Another feature is the direction of rotation of the grinder, which is such that the sparks and chips are thrown away from the operator, and the load of grinding toward him.

The motor bearings receive the lubricant through the center of the shaft from an oil reservoir at the back of the case, and the extended shaft bearings from a reservoir in the handle of the motor. The lubrication of the cylinders and valves is accomplished automatically by the pumping of a limited amount of oil through them under pressure at every revolution of the shaft. Each oiling of the motor supplies sufficient lubrication for five hours of continuous operation.



A Single Rotating Member and Two Self-Sealing Sliding Valves Are the Only Moving Parts in the Roto Portable Rotary Pneumatic Grinder

The weight of the machine complete does not exceed 14 lb., and it will swing either a 6-in. or an 8-in. wheel.

Representing cash dividend disbursement for the third quarter, manufacturing concerns at Youngstown, Ohio, will pay approximately $3,000,000 to shareholders, an increase of $800,000 over the July 1 distribution for the second quarter. The increase is due to the larger distributions made on their new common stock by the Youngstown Sheet & Tube Co., Brier Hill Steel Co. and Trumbull Steel Co., which will pay a total of about $2,500,000 to stockholders. The Sheet & Tube company will disburse $1,200,000 on common and $175,000 on preferred for a total of $1,375,000; the Brier Hill company will pay $625,000 and the Trumbull company $487,500. Falcon Steel Co., Newton Steel Co. and General Fireproofing Co. are other interests which will make dividend payments.

Safety Council Meets at Place of Birth

Remarkable Growth of Body in Eight Years—Bonus Plan Debated—Mental and Physical Condition of Workers Studied

EIGHT years ago a handful of enthusiasts met in Milwaukee and formed what is now known as the National Safety Council. In the eighth annual convention of that organization, held in the same city on Sept. 27 to Oct. 1, the registration was over 2700. The tremendous growth of the council is further evidenced by the fact that the original membership was 40 and the budget for the first year $1400, whereas there are at present 4079 members, representing 8000 separate plants and 7,000,000 employees, and the annual expenditures exceed $230,000.

The scope of the activities of the council congress which convened last week is indicated by the fact that nineteen sections held meetings in the various halls of the Milwaukee Auditorium. A twentieth section, a marine and navigation department, was organized during the course of the convention. The thorough and comprehensive manner in which all sides of the safety movement were presented was ample testimony to the fact that accident prevention work has passed out of the pioneer stage and has won for itself a recognized place in the business routine of American industries. One of the strongest impressions left by the Milwaukee meeting was the fact that less attention was given to the achievements of safety work and more time was devoted to discussion of constructive measures to solve the many-sided problems ahead. It was evident that the day has passed when it is necessary to justify safety work by presenting comparative statistics of accident records. To-day the employer of labor is interested in how he can get the best results from a safety organization already in existence.

Accident prevention was taken up in the congress in its broadest phases. What has been done in developing safety equipment was discussed in a number of papers. Organization for safety work was given careful attention. The importance of the personal element was emphasized and numerous methods of dealing with it were outlined. It is recognized that a large proportion of accidents, probably at least 75 per cent, are due to personal carelessness rather than to defects in mechanical equipment. A great opportunity for progress in safety work lies in the field in which the personal equation is the dominant factor. In this connection the importance of principles of organization, physical and mental condition of employees, motion study to ascertain the best and safest way of performing individual operations, methods of arousing and retaining the interest of employees such as the award of bonuses, inter-department contests, motion pictures, amateur plays, appeals through plant publications, were repeatedly dwelt upon. Many of these subjects received particular attention in the metals section, the meetings of which were devoted to the problems of the iron, steel and other metal industries.

Before the inauguration of organized safety work as it is known to-day, it was pointed out, the iron and steel industry achieved a most unenviable accident record. This was due to the fact that its intrinsic hazards were of a more pronounced character than those of the majority of industrial employments and its labor was drawn largely from the most ignorant classes of European immigrants. The many types of mechanical safeguards in the iron and steel industry have now reached a high state of development and well worked-out organizations for safety work have been perfected, but the human material with which safety engineers must work is little, if any, better than before efforts to reduce accidents were undertaken on a broad scale. The character of labor in the industry and the possibilities of working with it successfully in the interests of safety were discussed by Frank Moffett, engineer the National Malleable Castings Co., Cleveland, in an address before the metals section.

Must Study Personal Element to Prevent Accidents

Mr. Moffett in his talk before the metals section laid special stress on the fact that the personal element upon which so much of the success of future prevention work depends is a very complex factor and one which presents innumerable difficulties to the safety engineer, particularly at the present time when there are so many novices in the ranks of labor. During the war the high wages and attractive conditions of the North influenced the negroes of the South to leave the farms for industrial occupations. Thus within the industrial centers of the country we have a new element, the speaker pointed out, quite unfamiliar with shop work, and whose mental traits and characteristics are only imperfectly prepared for modern economic life.

Again there is the foreign element similar to the negro in that he wanders from calling to calling, the speaker stated. These foreigners are made up for the most part of the lower classes of various nations of the old world. Many of them are so illiterate that they cannot write their own names and have thoughts that are kept in motion by a slow succession of soft impulses. They seldom get clear impressions. They look at things without really seeing them. They lack the gift of instinctive forethought and their only idea is work and wages.

In treating the personal element which is invariably the cause or at least connected with most accidents, Mr. Moffett went on to say, the question of fatigue and statistical results as to the numbers of accidents and their relations to the various hours of the day and the time of labor have been gone over time and again. Now it is the tendency to turn from these things to recognize a still more important phase than that of fatigue, namely, the whole mental condition of the man. The ability to keep attention constant, to resist distraction by chance happenings in the workshop, and especially the ability to foresee the movements of various machines, cranes, vehicles, and the other fellow, are acknowledged as very different as between man and man. Aside from the man's psychological make-up we may consider some of the secondary factors, such as that a man may be too daring and may like to run risks; he may be old or young, or he still may need discipline; he may be too familiar or not sufficiently acquainted with local conditions; he may be ignorant as to the laws of forces, etc.—any one of these conditions, coupled with the fact that he may have something on his mind or troubles of his own may indirectly result in accidents.

Mr. Moffett stated that all these factors were, in turn, affected by the restlessness of the age, and the numerous consequences of the industrial revolution, the noise, dust and heat of factories, the monotony of specialized labor, the lack of direct personal contact of the employer and employee, the passing of old-time home life and the substitution of a nomadic existence in congested cities, and uncertainty as to permanence of employment. The present day worker, he said, is no more than a secondary wheel in a gigantic mechanism. He is separated from his work. He creates no longer; he fashions no longer; he brings nothing to completion; nothing appears as his work—nothing in

which his labor is embodied. The characteristics of the "inner man," in Mr. Moffett's estimation, will be learned through psychological studies. These studies will constitute a broader field for investigation than has yet been developed by safety engineers. Of the three great factors in safety work, materials, machine, and man, the last is not the least, said Mr. Moffett, but the most important.

Conserving Labor Through Motion and Fatigue Studies

Motion study with the idea of finding the one best way to do work, coupled with research into the effects of fatigue, presents an opportunity for large savings in labor and further large reductions in industrial accidents. This was the theme of a paper by Frank B. and L. M. Gilbreth, consulting specialists in motion study and fatigue reduction, Montclair, N. J., which was read before the women-in-industry section. Attention was also called to the possibilities of recovering the labor of those crippled in accidents. The pathetic results of failure of our Government, the authors declared, to recognize fundamentals in handling cripples' re-education, placement and prosperity, it is to be hoped, will be the cause of the National Safety Council in the near future undertaking the problem of helping constructively the crippled after their accidents as well as saving people from accidents. Attention was directed by the authors to a recent investigation in the field of the mentally handicapped, touched upon in a paper before the National Association for the Study of Epilepsy, and also in a talk to the safety council last May, which shows that here, also, is an opportunity for industrial expansion.

The use of the handicapped of all these types is a conservation of the human element, as well as an increase in much needed production, and thus a double benefit to humanity, the authors asserted.

Rigid Physical Examination an Important Safety Measure

Not only is there an opportunity to promote safety through psychological research and motion study, but much can be accomplished through rigid physical examination, conducted along the lines of an army or navy examination, said A. A. Bureau, safety engineer, Morris & Co., Chicago, in an address before the meat packers' section. In the past we hired men on the basis of education or skill, he went on to remark. To-day we realize that the physical condition is the greatest factor in hiring and placing men. A man's mental alertness, soundness of judgment, efficiency and skill depend, to a large extent, upon his physical condition. A man in poor health is like a dirty machine. He cannot make his body respond quickly in the face of impending danger.

The Human Element as It Concerns the Employer

It is recognized that the most important requisite in successful safety work is an effective organization. Methods employed in building up and conducting safety organizations were discussed by T. H. McKenney, supervisor of labor and safety, South Works, Illinois Steel Co., Chicago, in an address before the A B C Section on "Getting Results from Plant Safety Committees." The subject was also treated by R. A. Salisbury, supervisor of safety Interstate Iron & Steel Co., Chicago, in a paper read before the metals section on "Building a Safety Organization in a Foundry." Mr. McKenny expressed the belief that the success of an organization depended more on the attitude of the company officials than on that of the employees. If the backing and co-operation of the company officials is obtained, their influence will be reflected down through the superintendents, foremen, sub-foremen, and gang leaders to the workmen. In this connection Mr. Salisbury stated that a safety department should be able to justify its existence by referring the doubter to records. A prime duty of a safety organization is to maintain accident racords. In classifying accidents, causes are unquestionably of paramount importance to the safety engineer. These should engage his best attention and furnish him constantly with new ideas of accident prevention. Records should also be classified as to time lost. The records must also show cost of accidents both to the employer and employee.

The bonus system as adapted to safety work was the subject of a debate before the metals section. The discussion which followed brought out a sharp division of opinion on the merits of the bonus plan and indicated that some safety engineers resent the idea of "commercializing" the safety movement while others believe that a material inducement is justified in stimulating interest among workmen who are difficult to reach through other methods. J. Claude Smith, Inland Steel Co., Chicago, presented a formal argument in favor of a bonus system, and Philip Stremmel, superintendent hot mills, National Enameling & Stamping Co., Granite City, Ill., took the negative side of the question. Mr. Smith called attention to the fact that perhaps not more than 25 per cent of all accidents can be prevented by the use of guards and safety attachments, and that in most industries approximately 50 per cent of accidents may be charged to the hazards of the industry, and 50 per cent to negligence of workers. However, all accidents are preventable through care and caution on the part of those injured, their fellow workers and operating officials. The problem in preventing accidents, therefore, is to sell safety to the organization. The selling problem is solved through education to stimulate interest and obtain co-operation. An effective medium is a prize or bonus system, having many advantages. It reaches all employees, can be used to advertise safety, stimulates interest of workers, causes employees to read through rule books, rewards them for sending in suggestions for prevention of accidents, thus causing them to look for dangerous conditions. Group action and interest are obtained by awarding prizes to departments or divisions. Properly selected prizes build up a company spirit since they are won by many employees. Acknowledgment and reward for special interest and co-operation inspire all to real effort. A cumulative psychological effect results which has real value in the success of the entire safety movement.

Much care is necessary in selecting prizes, the speaker being of the opinion they should be practical and useful, with a prominent value and an advertising feature. If a safety emblem has been adopted by a company, it should appear on all prizes. In the case of the Inland Steel Co. the diamond shaped emblem is used on all prizes and printed matter relating to the safety department. A safety service medal in the form of a watch fob is given all employees in service six months or more who pass an examination on safety rules and who avoid accidents to themselves or others causing loss of time. A lapel button or pencil clip is awarded to new employees who read the safety rules and pass an examination within 10 days after being hired. Each new employee is given a card describing these prizes when he is employed.

Several thousand safety service medals have been given out and men wearing them are the best men in service. It is significant how highly these medals are valued, especially by those who can speak only a little English.

Awarding of prizes to all the employees of a department for attaining accident prevention records in competition with other departments stimulates interest and enables an effective campaign to be carried out. Such campaigns should be well advertised in the monthly safety publications and on bulletin boards.

Foremen can be stimulated to renewed efforts by awarding prize watches to foremen obtaining best results, eliminating each one as he wins a watch, but retaining his interest by encouraging him to assist the other foremen and penalizing each foreman who has a serious accident in his department by placing him at the foot of the list. Variety in prevention campaigns must be sought, as the same stunts lose interest when tried too often.

A plan worked successfully at the Inland Steel Co.'s plant is a safety gold watch raffle. This is put on in departments where special effort seems necessary to reduce accidents. The contest provides that if the department comes through a month without an accident causing loss of time a gold watch will be given the employee holding the lucky number. The co-operation of

NEW OFFICERS OF THE NATIONAL SAFETY COUNCIL.

Left to Right: W. H. Frater, treasurer; C. W. Price, general manager; L. A. DeBlois, third vice-president; W. H. Cameron, first vice-president; C. P. Tolman, president; W. E. Worth, second vice-president; J. A. Oartel, fourth vice-president; S. J. Williams, secretary and chief engineer.

each employee is thus obtained and his interest is aroused by the possibility he may win the watch. When the department has passed through a month without accident, a public raffle is held, and a safety lecture is given by some official, the time being opportune when safety is uppermost in the men's minds. Photographs of the men in a department are often taken, and a copy given each man with a letter of congratulation from the safety director.

Records of suggestions from workers show that before prizes were given as a reward for safety suggestions, approximately 100 per year were made, while after prizes were offered, 609 were turned in during a year. When the prize system was somewhat discouraged, suggestions dropped back to 283. Prizes were given to stimulate interest and co-operation and to advertise the safety first movement. It caused the safety machine to operate smoothly and effectively and makes a hit with the workers.

As men will risk death on the field of battle to win medals of valor, they will work relatively hard to save lives for which they will receive medals and tokens of honor.

Negative Argument on Safety Bonus

In replying to Mr. Smith, Mr. Stremmel stated that if "a notion store" is necessary to make the safety movement successful, the cause does not merit the high regard in which he has held it. He also pointed out that the workman who needs safety education the most is not the one who will be able to make a record to win a prize. Prizes, he contended, are bound to create jealousy both between departments and individuals. His remarks are, in part, as follows:

"No rewards or premiums should be given for safety work, as it has a tendency to make our men more interested in prizes than in promoting safety and cheapens the cause of safety in the minds of those we are desirous of reaching by holding up prizes rather than the thought of safety. As a safety first movement necessitates education, the result will depend largely on the spirit and motive, rather than obtaining a fob, knife or other reward. Serving on the committee of a church, lodge, club or other organization does not require the incentive of a prize to get the interest of members, but the spirit of the organization is sufficient incentive. With safety work, one must sell the idea to the workman by education which will give lasting results, and this cannot be accomplished by the giving of prizes. Loyalty cannot be bought or stimulated to give better service by giving prizes or premiums, but must be brought about by the satisfaction of knowing that one has done his duty to company and fellow workmen by having a part in making the mill a better place in which to work.

"The motive for doing safety work provides one of the greatest opportunities of getting all our men to think and study conditions in which they are working and to co-operate with other departments in making a safe place to work. More harm than good arises from the giving of premiums, for one usually finds that jealousy in various departments arises when a single or a few prizes are offered, when one or two men of nearly equal ability carry off the prizes to one department and leave other departments with inadequate recognition of their efforts. Safety is so new a movement that it is more a question of education than lack of interest. It is the question of getting our safety committees educated to what is expected of them. Our newer methods of education are going after the greatest good to the greatest number without awarding prizes.

"No mill or factory is stronger than the weakest employee. The individual who needs safety education most is not the one who will be able to make a record to win a prize, but it is the man who needs some one to coach him and help him think safety rather than the alert employee who is thinking safety not so much for himself or the other man but to win a prize. Such being the case, I take the position that if safety is to become a factor in industry and is to be made real, it will not be accomplished by giving some cheap prize, but by driving home the truth of the general situation. Safety will not prosper by the giving of prizes nor will it become of great importance, but if presented from the standpoint of loyal service rendered in the interest of their fellow men, showing them they have a large part in the game of safety, you will receive larger and better results which the giving of no prizes can accomplish."

Merits of Bonus, as Shown by Records

At the conclusion of the debate Dr. Lucian Chaney, United States Bureau of Labor Statistics, Washington, presented the results of a statistical study of a large number of plants operating under both the bonus and the non bonus plans. At the outset he said that there were four types of motives for interest in safety work; the humane motive, the motive of personal distinction, the motive of competition, and the motive with economic advantage. The safety movement was started on the basis of humanity and a large share of the pioneers look with suspicion on anything suggesting a commercialization of the cause. The question at issue is whether one can add to the humane motive the other three motives just mentioned. With the idea of ascertaining whether actual results justified material rewards for excellence in safety, the Bureau of Labor Statistics gathered data regarding iron and steel plants with similar working conditions. During the period

covered by the investigation, that is, 1912 to 1917, inclusive, the bonus-plan plants showed a greater decline in accidents than the non-bonus plants in the first two years, and continued to maintain the lower rate in subsequent years. This fall in accidents, however, was due to a decline in the number of minor injuries. In severity of accidents the non-bonus plants showed a fairly steady decline throughout the period, whereas the curve for the bonus plants showed a sharp decline at first but in 1917 rose to a point higher than where it started in 1912. Dr. Chaney expressed the belief that the grouping of plants was sufficiently large and the period of the test sufficiently long to indicate typical results. Similar investigations not yet fully completed showed the same phenomena, that is, a rapid decline in minor injuries and a slight increase in severe injuries. The reason, he stated, probably lay in the fact that safety departments gaged success by frequency of accidents without giving due weight to severity. The penalty for major injuries, he said, was not great enough. Often death through an accident is recorded in the records as ten days' loss of time. So long as death and cases of major mutilation are improperly weighed, bonus contests will always result in attention to minor hazards at the expense of the greater hazards.

The Bethlehem Bonus Plan

In the general discussion following Dr. Chaney's address, J. R. Mulligan, Bethlehem Steel Co., stated that he was in favor of a cash bonus to safety committeemen for services rendered. He disagreed with the opponents of the bonus plan on the grounds that they are idealistic. Eight years of safety work, he said, have not achieved commensurate results considering the efforts expended. It is about time to put safety work on a practical basis. Mr. Mulligan then outlined the bonus plan which has been put into effect in the Bethlehem Steel Co. plants. Safety committeemen are trained in first-aid work and safety principles in a four months' course conducted on company time. They then serve on committees for six months. Departmental committees are made up of equal numbers of foremen and employees. In addition there is a permanent member of the committee who handles the details of calling the meetings, keeping the minutes, maintaining accident records, etc. The superintendent of the department is ex-officio a member of the committee and is responsible to the management for the results achieved. Meetings are held monthly. Committeemen, however, do not wait for the meeting to report hazards or other matters having a bearing on the work, but immediately get in touch with their respective foremen. The meeting itself, then, is rather devoted to things done than to things to do. To get the personal interest of the committeemen every day of the month, there must be some cash inducement or other method of compensation. The plan of the Bethlehem company is to ascertain the past history of a department and then to set a certain reduction in accidents as the end to be achieved by the men. If the reduction is achieved, each committeeman is paid a bonus of say $10. If there are ten men on the committee, the total outlay in bonuses will be $100, or about one-tenth the cost of many common injuries. It is far more logical, said Mr. Mulligan, to compensate before accidents through the bonus plan rather than to compensate the injured afterwards. The latter is a form of compensation which never compensates.

Developments in Devising Mechanical Safeguards

That engineers have made great progress in devising methods and equipment for preventing accidents was indicated by two carefully prepared addresses presented before the metals section. L. A. Touzalin, assistant superintendent, blast furnaces Illinois Steel Co., South Works, Chicago, recounted in detail the precautions, both in methods and equipment, which are now taken to protect blast furnace men at his plant. Nicholas Prakken, Pawling & Harnischfeger, Milwaukee, described the safety features of overhead electric cranes from the standpoint of construction and design. Of interest in connection with Mr. Touzalin's address was a demonstration of a new carbon monoxide detector by Capt. Guy H. Burrell, Mine Safety Appliance Co., Pittsburgh. He also explained a gas mask which has been devised as a protection against carbon monoxide gas.

Fixing the Responsibility for an Accident

One of the most interesting features of the convention was a play presented by members of the metals section, and prepared by J. R. Mulligan, supervisor, accident prevention and education Bethlehem Steel Co. Three scenes were shown: First, a machine shop in which the foreman was a safety enthusiast; second, a shop in the same plant in which the foreman through his failure to give safety instructions is directly responsible for an accident; third, the investigation by the superintendent, in which the advantage of a safety organization becomes apparent when the machinery for inspection and taking testimony fixes the responsibility where it belongs and results in the discharge of the foreman. The cast of characters included: George T. Fonda, Bethlehem Steel Co.; W. E. Watters, National Malleable Castings Co., Melrose Park, Ill.; D. P. Kennedy, Pittsburgh Plate Glass Co.; V. A. Lewandowski, National Malleable Castings Co., Toledo; J. A. Northwood, Cambria Steel Co.; J. H. Jeffery, and F. A. Nilles, National Malleable Castings Co.; W. E. Megraw, H. W. Roberts Co., Ambridge, Pa.; J. R. Mulligan; H. E. Steinmetz, Midvale Steel & Ordnance Co., Coatesville, Pa.; and J. A. Oartel, Carnegie Steel Co., Pittsburgh.

Officers of the Metals Section

The metals section elected the following officers for the coming year: Chairman, W. E. Watters, National Malleable Castings Co., Melrose Park, Ill.; vice-chairman, J. A. Northwood, Cambria Steel Co.; secretary, J. R. Mulligan, Bethlehem Steel Co.

The annual banquet had a very large attendance. The principal speaker was R. W. Campbell, chairman, central safety committee Illinois Steel Co., Chicago, and first president of the council. Mr. Campbell recounted the early struggles of the society following its organization in Milwaukee eight years ago, and traced its progress since that time.

Council Officers

Council officers elected for the ensuing year include: President, Charles P. Tolman, chairman manufacturing committee National Lead Co., New York; first vice-president, W. H. Cameron, secretary National Workmen's Compensation Service Bureau, New York; second vice-president, W. E. Worth, assistant manager, industrial relations department International Harvester Co., Chicago; third vice-president, L. A. DeBlois, manager safety section E. I. du Pont de Nemours & Co., Wilmington, Del.; fourth vice-president, J. A. Oartel, director safety Carnegie Steel Co., Pittsburgh; general manager, C. W. Price, re-elected; secretary and chief engineer, S. J. Williams, re-elected; treasurer and business manager, W. H. Frater, re-elected.

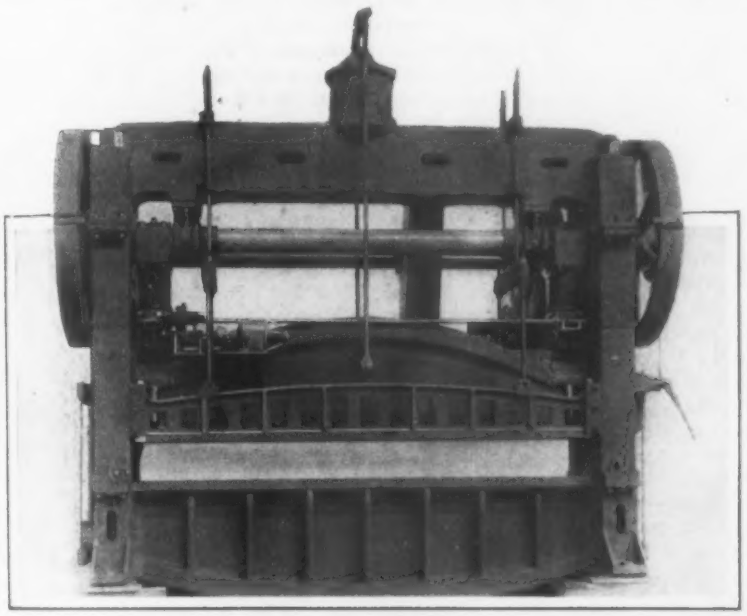
Among the newly elected directors are: R. W. Campbell, Illinois Steel Co.; Alexander Brown, Brown Hoisting Machinery Co., Cleveland; B. C. Ball, Ball-Wilamette Steel Co., Portland, Ore.; R. P. Tell, National Brake & Electric Co., Milwaukee; G. L. Avery, the Avery Co., Peoria, Ill.; W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind.; J. M. Eaton, Lincoln Motor Co., Detroit; Charles R. Hook, American Rolling Mill Co., Middletown, Ohio; L. B. Robertson, General Motors Corporation, Detroit; B. F. Tillson, New Jersey Zinc Co., Franklin, N. J.

Prominent among the visitors to the congress were Maj. H. L. Doidge, O. B. E., H. J. Pye, and W. J. Painter, representing the British Industrial Safety First Association. At the banquet Major Doidge read a greeting from Lord Leverhulme, president of the British association. In his remarks Major Doidge stated that the British organization had been in existence one year and that it had gained much of its inspiration from the success of the National Safety Council in this country.

A large exhibit of safety devices was held in the Auditorium concurrently with the congress.

500-Ton and 800-Ton Tie Rod Presses

The tie rod form of press, adaptable to large bending, blanking, pressing, shearing, multiple punching, group punching and other similar operations, is used for work done in quantities large enough to warrant the purchase of a press of sufficient size and capacity to accommodate pieces of large dimensions. These presses,



Tie Rod Presses of 500- and 800-Tons Capacities Used to Blank Out Side Rails for Motor Vehicle Frames

it is believed, owe their usefulness to three outstanding features, as follows:

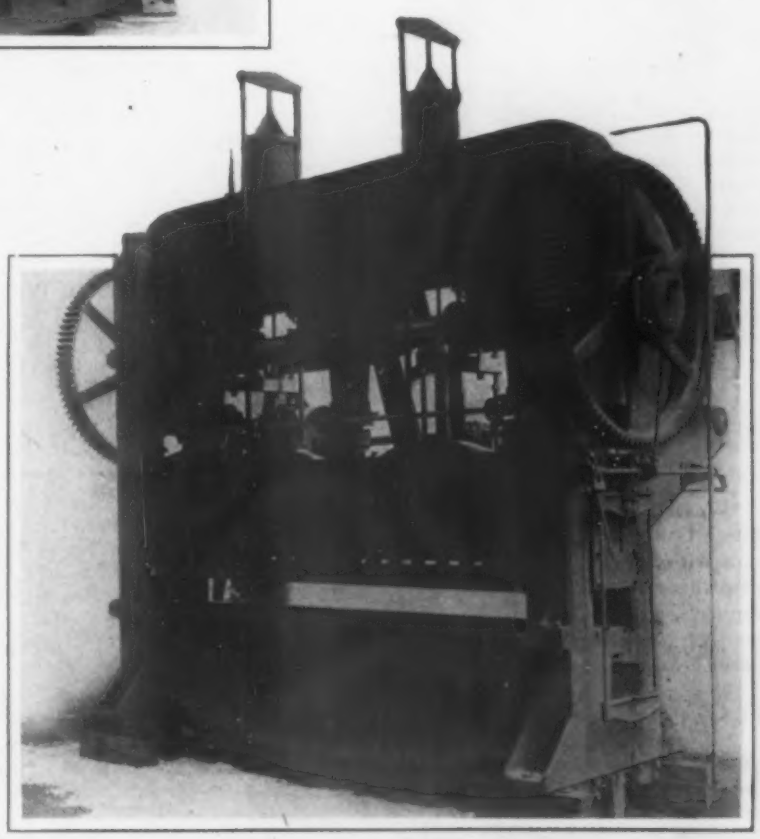
1. Gears and operating parts are located overhead, so that the work can be placed into and removed from the machine from the front, the back or either end. The side housings are made with openings or windows between the tie rods.

2. The tables and rams are designed for large die areas and openings. T-slots allow rearrangement of tools for various jobs.

3. Vertical operating stresses and strains are taken up by forged steel tension members which fasten table, housings and bridge tree together thus to eliminate broken housings.

Williams, White & Co., Moline, Ill., designers and builders of forging, pressing, punching and shearing machinery, have recently completed two large tie rod presses of 500- and 800-ton capacities. These machines are being used to blank out side rails for motor vehicle frames, the former for pleasure cars, the latter for trucks.

The die space adjustment is by large screws in the pitmans, operated through worm gearing by a separate motor mounted on the ram. The hold-downs or strippers are of steel, with a T-slot in the face of each for attachment of specially shaped contact fingers, and are operated by cams on the main crankshaft. The table on each machine has 4 T-slots and an opening 6 in. wide in the center the length of the machine. The ram face has 5 T-slots. The clutch is of the friction type, with liberal surfaces. Automatic stop and brake are provided. All gears are steel. Twin drive is employed with cut-tooth drive gears and pinions on each end of the main shaft, for equalizing the drive and eliminating torsional lag. An automatic die kick-out, connected to the ram and operated by it, is furnished to strip the work from the dies. All frame castings were made in the Williams, White foundry. One of the largest castings weighs 35 tons.



The following are the principal dimensions of the two presses:

	500-Ton Press	800-Ton Press
Distance between housings, ft.	16	18
Table width, in.	30	30
Ram face width, in.	30	30
Die space, ram up, adjustment up, in.	23	23
Die space, ram down, adjustment down, in.	11	11
Stroke, in.	7	7
Die space adjustment, in.	5	5
Window openings in housings, in.	24	24
Height overall, ft.	21	24 7
Length overall, ft. and in.	21 10	24 9
Width overall, ft. and in.	10 6	13 2
Strokes per minute	12	8
Drive motor, hp.	75	100

Railroad Loans Approved

WASHINGTON, Oct. 5.—Loans to railroads approved by the Interstate Commerce Commission include $2,460,000 to the Wheeling & Lake Erie Railway and $2,000,000 to the Chicago, Rock Island & Pacific Railway. Both loans are to aid in meeting maturing indebtedness. The former road will make additions and betterments to roadway and structures, in addition to meeting 1920 short-time maturities. The Wheeling & Lake Erie must finance $1,200,000 additional, while the Rock Island must obtain from other sources $6,000,000.

William G. Woods, 14 Oak Street, Lowell, is president, and Frank Starnfield, 80 Thornton Street, Revere, is treasurer of the Metal Sales Co., Inc., recently incorporated under Massachusetts laws to deal in high speed steel, tool and die steel, drill steel, and, in fact, all kinds of steel.

The traffic departments of the Stanley Works and of the Stanley Rule & Level Co., New Britain, Conn., hardware, have been consolidated.

PROPOSED CANAL PLANS

Advocates of Waterway From Lake Erie to Ohio River Much Encouraged

PITTSBURGH, Oct. 4—Proponents of the plan to connect up Lake Erie and the Ohio River by a canal are optimistic with regard to the results of a series of hearings recently conducted here and at other points along the Ohio River by the United States Board of Engineers, appointed to take evidence and report on the feasibility as well as the need of such construction.

Four routes have been proposed. One would start on the Ohio River at Cincinnati and run to Toledo by way of the Miami and Maumee rivers. Another would run from Portsmouth, Ohio, to Port Clinton, near Sandusky, Ohio, going by the Scioto River near Columbus. A third route proposed would start at Marietta, Ohio, and reach Lake Erie at Cleveland, passing through Zanesville and using the Muskingum River.

The fourth route, and the one most strongly favored in Pittsburgh, would start at Beaver, Pa., on the Ohio River, and run through New Castle, Pa., to Youngstown and Niles, Ohio, to the mouth of Indian Creek and terminate at a point six miles west of Ashtabula, and a mile east of Geneva-on-the-Lake, Ohio. This route would involve the building of a canal of only 101½ miles, as compared with 240 miles for the Marietta route, 242 miles for that from Portsmouth to Port Clinton and 249 miles of canal which would have to be constructed to connect up Lake Erie and the Ohio River at Cincinnati.

The great object of the canal being to relieve the railroads of bulk freight and to prevent a repetition of the congestions which develop from time to time on the railroads, the Beaver route makes the strongest appeal, not only because it is the shortest one, but because it would tap the center of the iron and steel and coal industries, provide an infinitely greater tonnage than the other routes.

It was brought out at the hearing held here that the Carnegie Steel Co. alone would provide about 12,000,000 tons of freight annually for a water route between Pittsburgh and Lake Erie and the total up and down tonnage for the route would run well up toward 100,000,000 tons yearly. This estimate is based on returns from various iron, steel and coal companies in a position to use the Ohio, Monongahela and Allegheny rivers, which are so located that they could be served by a canal along the proposed route. No other route, it is claimed, could muster more than 15,000,000 tons of freight annually.

The construction of a canal that would make possible the bringing down of ore from the Northwest and the sending up of coal and manufactured products by water has been agitated for practically 30 years. Previous attempts to get the project started have failed because those likely to have benefited have been indifferent and the opposition of the railroads has been sharp. Moreover, the movement was fostered entirely by the State of Pennsylvania and a Pennsylvania body could not well pursue its plans beyond the state boundaries, which would have been necessary in order to route the line in such fashion as to secure sufficient water.

Opposition from the railroads to a canal has decreased and a number of steel companies, which maintained a passive attitude in previous efforts, now are actively backing the project. It is realized that if there had been greater development of the inland waterways, the recent heavy accumulation of steel at the plants resulting from the paralysis of the railroads might have been largely avoided. The fact that the U. S. Steel Corporation has decided to use the New York barge canal gives fresh support to the Lake Erie and Ohio River project. The increase in railroad freight rates is another argument in favor of the greater use of inland waterways, because of the big savings that could be effected.

Financing the canal in the past always has been the big obstacle to success, for State appropriations were not obtainable; the cost was too great for private interests and a plan for those benefited to pay for its construction never found much favor. If the canal is built now, it will be from funds appropriated by the National Government.

BETTER CAR SUPPLY

Conditions in Steel Loading Districts Are Reported Improved

WASHINGTON, Oct. 5—Although the Interstate Commerce Commission's order limiting the use of open top cars with sides in excess of 38 in. to coal continues in effect, there has been a gradual improvement in the car supply for other commodities than coal according to the semi-monthly report on traffic conditions of the Car Service Division of the American Railroad Association.

Commenting on the supply of open top cars and conditions in the steel loading districts, the report says:

"The upward trend which the production of bituminous coal has taken during the past few weeks reflects the improved car supply which has been made available by extraordinary efforts on the part of all railroads in speeding up the movement of coal cars. However, the exigencies of the coal situation necessitated the issuance of Service Orders 15 and 16 effective Sept. 19 containing practically the same provisions as original orders 7 and 9 curtailing the distribution of open top cars to commodities other than coal.

"The conditions in the steel loading districts are reported as somewhat improved. In fact, a progressive decrease has been made in the amount of steel stored since July 1, and the present effort of the railroads is to reduce this storage to normal.

"Permits are still being issued to cover the supplying of coal carrying cars for commodities other than coal, where such movements cannot be protected under Service Order 15. Only material urgently needed for the public welfare is being considered in the issuance of these permits."

Figures on loading of cars for the week ending Sept. 18 indicate that, despite the increase in freight rates, traffic continued heavy in the month of September. The total number of cars loaded in the week ending Sept. 18 was 983,913. In the week ending Sept. 11 the total was 872,043. In the week ending Sept. 4, 947,743 cars were loaded. The totals for the four weeks of August ranged from 942,150 to 985,064. Totals for the first three weeks of September, 1919, ranged from 904,393 to 994,991.

The total for the three weeks ending Sept. 18, 1920, was 2,803,699 cars. This total was far below the total for the corresponding weeks of 1918 and 1919, that of the three weeks of 1919 being 2,846,354, and that of the corresponding weeks of 1918 being 2,827,277.

The first two weeks following the placing of the new freight rates into effect showed a decrease in the number of cars loaded, but the total for the week ending Sept. 18 was practically equal with the record week of August and not much below the record week of September, 1919, when traffic was about as heavy as at any time in the history of the railroads.

The Ward Tool & Forging Co. of Latrobe, Pa., has completed arrangements with John D. Scott, Inc., with whom is affiliated John E. Love, for representation in the state of Michigan and the northwestern part of Ohio. Mr. Love's office is at 1156 Penobscot Building, Detroit.

President W. G. Mather and Secretary Samuel Mather, of the Cleveland-Cliffs Iron Co., together with about 50 company officials, managers and department heads, held a banquet recently at Munising, Mich., to celebrate the seventieth anniversary of the organization of the company, the concern having started in Negaunee, Mich., in 1850.

Motor Frame for Electrically Propelled Battleships

The propulsion of American battleships by electricity has developed the necessity of producing large motor frame castings of steel. The illustrations show some of the steps in the casting of a 25,000-lb. half frame for a generator for the Westinghouse Electric & Mfg. Co. The castings are the product of the American Steel Foundries' plant at Chester, Pa.

The Flask in the Pit and the Sweeping Up of the Mold. The flask is 18 ft. square.

The Pattern in Position and the Partly Completed Mold.

Placing the Cores in the Mold. There are 27 Cores Needed.

The Dry Mold Showing Some of the Cores in Position.

Starting to Clean the Casting (Upper).

The Finished Casting in the Annealing Furnace. Its diameter is about 17 ft.

AUTOMOTIVE INDUSTRY

Leaders in Detroit Give Their Views on Prices and Factors

DETROIT, Oct. 4—The heads of the principal automobile manufacturing companies in this city have been interviewed to determine, if possible, the outlook of the automotive industry in Detroit; to find the causes for the price reductions, and to ascertain the effect of the reductions on the prosperity of the industry.

Mr. Ford's attitude as to prices is well known.

"General Motors has always maintained prices at rock bottom levels," said T. S. Merrill, secretary of the corporation, quoting an earlier statement by W. C. Durant, president. "No reduction in prices of automobiles manufactured by General Motors concerns is contemplated. The automotive industry as a whole rests upon a sound basis of demand, and there is no reason to foresee anything but prosperity in the future."

"The automotive industry in Detroit is fundamentally sound," said Alvan Macauley, president Packard Motor Car Co. "Whatever the present situation may be, over a long period of years we may expect only increased prosperity. There are 18,000,000 potential buyers. Motor cars are wearing out at the rate probably of 1,000,000 a year. The demand for replacement must be at least 500,000 a year. On this basis the stronger companies need have no fear for the future." The Packard company has guaranteed to its purchasers the maintenance of present prices at least until July 1, 1921.

"Mr. Ford's price decrease will have little, if any, effect upon the motor car industry," said G. H. Lang, vice-president Cadillac Motor Car Co. "I think he can spare the money and still make a handsome profit. The tendency of labor and material prices is still upward, and consequently, while reduced automotive prices will come eventually, it will not be for many months."

"There are no economical grounds to justify the reduction of automobile prices at present," said Harry M. Jewett, president Paige Detroit Motor Car Co. "The price of Paige cars has always been based on cost of the best material, the best workmanship and fair profit. The costs of basic materials have gone up. Nevertheless, to support what seems like a worthy movement toward the reduction of the high cost of living, we are willing to make our own sacrifice and will cheerfully accept the loss in the new prices which we have announced."

"The Dodge Bros. Co. is contemplating no change in price," said A. T. Waterfall, assistant manager. "There is no reason for pessimism concerning the future of the industry as a whole."

W. C. Leland, vice-president and general manager Lincoln Motor Co., can foresee only a bright future for the industry in general. He could foresee no conditions for a long time to come that would permit any reduction in the prices of the new Lincoln car.

"Mr. Ford's charge that the automotive industry has been profiteering is absolutely unfounded," said W. Ledyard Mitchell, president Maxwell Chalmers Co. "No company producing a legitimately priced car can cut prices at this time without taking a heavy loss. Mr. Ford's prices are such that he can make drastic reduction without suffering financially."

"Material prices will come down eventually," say officials of the Continental Motors Corporation, "but there is no legitimate way for an honest company to reduce prices at present."

"Automobile manufacturers who have honestly priced their cars cannot reduce prices at this time and exist," says O. C. Hutchinson, vice-president Hupp Motor Car Co. "Labor, material and freight are still at peak costs so that a pronounced cut would be poor business. We have orders for more cars than we can produce, and foresee a good year ahead."

As an immediate effect upon the automotive industry of the price decrease some of the companies will suffer a loss. The very strongest companies will not be much affected, owing to large organizations and the possibility these organizations have for cutting overhead costs. Some of the weaker companies in other cities which have been able to operate only while the margin of profits was comparatively large may be forced to suspend operations, but there is little probability that any Detroit automotive manufacturers will be forced to do so.

CANADIAN BUYING

Warehouses Are Cautious—Active Demand for Tubes

TORONTO, Oct. 5.—The Canadian trade is not in love with the premium mills in the United States, but truth will out, and were it not for the premium mills there would be a number of industries in Ontario, at least, with certain parts of their establishments shut down entirely. Warehouses are showing more caution in taking on much premium tonnage, fearing that the high market may crack some day, leaving them with a big shipment of fancy figure steel in transit to dispose of in a sliding market.

The double steel market of United States finds expression in Canada. One of the largest warehouses here this week took on some 400 tons of black sheets, for which it paid 8c. base at the mill, while at the same time it has some thousand tons on the books of the Corporation at not much over 2.65c., the business having been placed almost a year ago now. All this high-priced material can be disposed of around 12c. without sending a man on the road, so great is the demand for sheets, especially among the stove and electrical industries.

Deliveries of tubes are not in keeping with the demand, which is insistent for 3½ in. and 4 in., many of the large plants not being able to do the usual amount of tube replacement before the cold weather arrives. Plate is not in the same demand as it was a few months ago. The shipbuilding plants around here are not busy, the last one to close being the Dominion Shipbuilding Co., the cause for which is stated to have been the closed shop and lack of production per man.

The increased freight rates in Canada have caused an upward revision of prices from stock. Iron and steel bars and bar mill shapes are now selling at 5.75c. per lb., which makes a new high mark that has not been equaled in the memory of the older merchants here.

The Machine Tool Market

There is no large buying in the Canadian market, some railway specifications having been the largest prospect from any one buyer. But there is a fair amount of scattered buying and none of the dealers complain of dullness. Some of them are certain that tight money, with the disinclination of the banks to finance purchases just now, is keeping a number of buyers out of the market. There is undoubtedly a tendency on the part of many of the houses to protect themselves even more than usual in any machines that leave their premises. The automobile business is not buying now in Canada; in fact, many of the plants are running on very short time, while others are closed.

The scrap metal yards are doing a very ordinary sort of business. There is not much material in any of the yards, especially in the white metals. During the war the country was pretty well combed out for cast iron, stove plate or heavy melting steel, and the supply is not generous. The big users are not buying, as their supplies of coal from United States are not satisfactory. A lower level of prices will probably help as much as anything else to bring about a resumption of dealing.

The W. J. Burton Co., Detroit, dealer in sheet metals, has occupied its new warehouse at Junction and Federal avenues, Detroit. This doubles the company's warehouse capacity.

Increased Efficiency of Labor at Detroit

Production Not Decreased by Reduction of Working Forces—Better Class of Workmen Due to Ability of Employers to Make Selections

DETROIT, Oct. 4—Increased productivity of labor, already evidencing itself, according to Detroit manufacturers, and becoming more pronounced each week, is one of the brightest spots in the industrial situation.

With an epidemic of price-cutting sweeping the country, manufacturers declare they are depending upon two factors to make these decreases good business. They are lower prices of raw materials and increased production on the part of labor.

The first factor is already a reality. But it is to increased production that the manufacturers are looking for decreased manufacturing costs. Many straws show in which direction the wind of labor is blowing.

One automobile manufacturing company in Detroit discharged 1000 men during August, but the output for that month was the largest in the history of the company. Another discharged one-third of the loading gang and used the remaining two-thirds only mornings, yet more cars were loaded and shipped during the first week after the force reduction than during any week in the company's history.

Pick Men Instead of Steal Them

One large employer of labor in Michigan says: "There is no decrease in wages, but there is a great difference in my field. Formerly I had to steal men from other concerns, and take whatever men I could get. Now I can pick good men who come to us for work. The result is better work and lower costs."

"Labor is coming to realize that there can come a time when its attitude reacts upon itself," said the assistant general manager of one of Detroit's largest industrial concerns. "I believe that since the war industrial employees have not been 60 per cent efficient. In addition, they were independent of orders, taking offense and leaving the job upon the slightest occasion. To-day the attitude is different. There are signs that the men are actually performing their duties in an efficient manner. They want to hold their jobs. There is coming competition for the jobs; and they are beginning to realize it."

Some manufacturers state that there seems to be a better class of labor available than in the past. One manufacturer says that a decided increase of individual efficiency in his plant resulted from a change from closed to open shop policy. The following statements were made by manufacturers in the stove and drop forging lines:

"We find that at present conditions are much better in our business, owing chiefly to closer supervision and a better class of workmen, which was brought about by the fact that we have not had such a large labor turnover recently as we had some time ago. We still find it hard to procure skilled labor, but apparently common labor is more plentiful."

"During September of this year, with the same working force as last year, we find a 20 per cent production betterment."

Time Labor Output 30 Per Cent Low

An automobile accessory manufacturer, speaking for himself and others in his line, said:

"We note a slight increase in the productivity of individual workmen. The reason for this is that in many departments changes have been made from week-work to piece-work. In all departments in the factories where the change has been made the output is entirely satisfactory, but the output on time labor is fully 30 per cent below normal."

Unemployment is generally considered a sign of hard times, yet the opinion of experts is that in most lines winter business will be good. Detroit, like the rest of the country, is disturbed by the uncertainty of the price reaction, but that this condition will gradually disappear is the general belief.

Marked Increase in Immigration

YOUNGSTOWN, OHIO, Oct. 5.—Within the past month there has been a marked increase in the inflow of immigrants to the Mahoning and Shenango Valleys, principally from central and southern European countries. Steamship agencies report that their vessels are booked for months ahead on passenger transportation, and that hundreds of prepaid tickets are sold to members of the foreign colonies in Youngstown, Warren, Niles, New Castle, Sharon and Farrell. Leaders among the foreigners assert that members of all nationalities are besieged with requests from relatives and friends in Europe to advance transportation. Purchase of passage in Europe is beyond the reach of the mass of people because of the exchange situation and the high cost. Most of the tickets sold are for second and third-class accommodation.

Famine, poverty, unrest, lack of work and revolution are assigned as reasons why so many in Europe are coming to the United States. Italians comprise the bulk of the immigrants reaching the Valleys, although there are goodly numbers from Central Europe and the Balkan States. Because of their love of the open country, Italians do not as a rule make successful workmen in the steel industry and the number absorbed by the mills is therefore proportionately small. Hungarians, Austrians, Czecho-Slovaks, Bulgarians and Roumanians make more acceptable workers, and many of them become semi-skilled and skilled. Hungarians and Bulgarians, in particular, by their thrift and industry, win responsible positions in the mills in many cases, and in the Youngstown district some men of these nationalities have been employed by one company from 15 to 20 years. They readily assimilate American customs and manners.

Growing numbers of Spaniards employed in the industry is noticeable from the number of labor camps established for them. On the whole, they have proved indifferent workmen.

More Unemployment in Wisconsin

MILWAUKEE, WIS., Oct. 5.—"Labor conditions in Milwaukee agree with facts reported from other parts of the country," says the September number of the monthly bulletin of business and financial comment issued by the First Wisconsin National Bank of Milwaukee. "There has been some decrease in the number of men employed. This has had the effect of making jobs appear more valuable, as witnessed by increases of applications in the various industries and an average lower turnover for the past month.

"In the metal trades, 25 shops reporting, the separations during July were 3540, and during August, 3654. The turnover for both months was approximately the same, or 20 per cent.

"Of considerable interest are some figures of turnover in the metal trades for 1914. Death accounted for 1 per cent of the changes; sickness, 5 per cent; unavoidable, 10 per cent; errors in hiring, 80 per cent; miscellaneous, 4 per cent.

In the present year, from data available, it is estimated that the turnover would run somewhere between 140 and 150 per cent.

"All reports seem to agree that employees are working more steadily and efficiently. Now that wages are stabilized and it is not so easy to quit one shop and find a place in another the next day, it may be expected that men will stick and by so doing increase their use-

fulness as producers and cut down the waste resulting from excessive turnover."

Assaults on Worcester Molders

Assaults on workmen employed in some of the Worcester, Mass., foundries are on the increase. Since the strike was called in that city some 18 months ago, there have been six minor and eight serious assaults on Reed-Prentice Co. foundry workers, five minor and six serious on Whitcomb-Blaisdell, one minor and one serious on Rice, Barton & Fales, and five serious on Wells Chemical Bronze Foundry Co. workers, a total of 32 assaults, in addition to 12 minor and 18 serious assaults on workers at other plants involved in the labor troubles. The assaults during the present time are directed largely against the Wells Chemical Bronze Foundry Co. workers.

Few convictions have resulted during the past 18 months and but one arrest made so far in connection with the most recent assaults. The police apparently are doing everything in their power to stop the assaults, but the chief of the department has stated he is handicapped by the lack of plain clothesmen. Mayor Sullivan, Worcester maintains the city is law-abiding and has left the question of maintaining order in the community entirely in the hands of George H. Hill, chief of police.

Bethlehem Savings Plan

At the request of the employees, the Bethlehem Steel Co. and its subsidiary companies have just perfected a plan by which the employees can invest regularly a part of their wages in Government securities and obtain those securities at current market prices, thus obtaining the opportunity for the profit which those prices present.

Under the plan the company will purchase at market prices various issues of Liberty bonds and Victory notes and hold them for employees who desire them. The bonds are sold to the employee at the same price at which they were bought and will be paid for by weekly, fortnightly or monthly reductions from the pay of the employees who purchase them.

Advance in the price of the bonds after they have been subscribed for will not affect the employees, who will obtain them at the price current when the subscription was made.

When the bond has been completely paid for it will be delivered to the employee with accrued interest. The amount of the weekly or monthly payments will be graduated according to the size of the bonds. For a $50 bond, $1 a week will be required. Larger bonds will require proportionate deductions from the pay check.

Employees Buy Stock

Following the advice of President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, there has been liberal buying of common stock of the company by employees. Within a short time this company, with the Brier Hill Steel Co. and the Trumbull Steel Co., will offer its workers a deferred payment plan of purchase, the payments to be deducted from their wages. These plans are now being perfected. In a recent statement to employees, Mr. Campbell commented upon the fact that while there had been a disposition among manufacturers generally to complain of low output, no such conditions obtained at the Sheet & Tube company works. On the contrary, he stated, the organization had been able to produce highly satisfactory tonnages, though seriously hampered by transportation conditions. Mr. Campbell expressed the hope that with the right sort of co-operation the company would be able to get through "these troublesome times," so that those who work in the mills need not suffer from unemployment.

He states there appears to be plenty of business in sight to keep the plant in full operation for the rest of the year, but voices the fear that the fuel shortage and shortage of cars for shipment of product may cause more or less intermittent operations.

Sweeping Injunction

DETROIT, Oct. 5.—The Bryce Heating & Ventilating Co., a Toledo concern, acting for itself and the Detroit Association of Sanitation and Heating Engineers, has been granted a temporary injunction in the United States district court at Detroit restraining members and officers of building trades labor organizations in Detroit from interfering with the workmen and the building jobs of the plaintiffs. The application for the injunction was made Sept. 18 and it was granted the same day.

The plaintiffs charged wanton destruction of property, assaults on workmen, threats against foremen and general interference with various contract jobs. The abuses charged in the complaint are generally assumed to be a part of the program adopted by the building trades unions to combat the so-called American plan of employment, or open shop agreement, entered into by the Associated Building Employers.

The temporary injunction is believed to be the most sweeping ever granted in a labor case in this district. It carries with it a penalty of $10,000 for violation of its provisions.

The Cost of Strikes

WASHINGTON, Oct. 5.—After endeavoring to gather full information as to the costs of strikes the Bureau of Labor Statistics has come to the conclusion that not even the approximate cost can be ascertained and that all figures purporting to represent the cost in money have no value whatever.

The bureau refers to the steel strike as showing the difficulties of gaining accurate information as to costs. Because of the difficulty of ascertaining the number of persons actually on strike and the different statements made by the two sides, it is held to be impossible to get figures of any value.

The innocent third party, the public, the bureau says, seldom suffers a money loss, its losses being mostly in the matter of inconvenience.

In the World of Labor

The Standard Steel & Bearings Corporation, Plainville, Conn., has let about two-thirds of its employees go and is operating on a nine-hour, five-day week schedule.

The Fafnir Bearing Co., New Britain, Conn., ball bearings, which has been operating on a 55-hr. per week basis and paying time and a half for the two hours in excess of the 8-hr. day, has reduced its working force and has gone on a 45-hr. per week basis.

The clubhouse at the Athol Machine Co., Athol, Mass., a store room at the Athol Mfg. Co., and an old church at that place are being used for moving pictures which are shown to the foreign-born employees of the different factories to increase their knowledge concerning America.

The Ford Technical Institute, which will open in Detroit about the middle of October, has had applications for registration from workmen in 30 states. There will be four year courses in electrical engineering, mechanical and chemical engineering, the first year being the same for all registrants. Freshmen will receive 40c. an hour, both for shop and class room work. The class week, which alternates with the shop week, will be of 42 hours, while the shop week will be 48 hours. On graduation neither the Ford Motor Co. nor the student is bound by any obligation to the other.

The Trumbull Steel Co. has offered 80,000 shares of common stock for sale to employees at $27.50 on an installment basis, with liberal bonus dividends and provisions for transfer without additional payments in case of death of subscriber. The current market quotation is $30.75.

The American Steam Conveyor Corporation has changed its corporate name to the Conveyors' Corporation of America. Recent extensions include the addition of new lines of business and the purchase at South Bend, Ind., of a large machine shop to which foundry facilities will be added.

Exchange Beginning to Benefit Germany

Foreign Interest Spurring Home Demand—Present Stagnation Begetting Zealous Labor—Renewed Demand for Abolishing Export Duties

(*Special Correspondence*)

BERLIN, GERMANY, Sept. 11.—During the past fortnight the coal question has developed unfavorably, with serious results for the metal industries because in this branch a marked revival of buying has begun, and the consequent shortage of pig iron is aggravated by shortage of coal. Outside Silesia, the coal production has been relatively satisfactory. Great activity is being shown in opening new brown-coal mines; and on the Ruhr over 90 per cent of the workmen are doing the extra-shift work agreed to in principle last March. Also most reports mention an increase of working zeal. The last is a result of the general business stagnation, which in most branches has caused a reduction of the working week, with the result that strikes have almost ceased.

In August, the first month to come under the coal delivery agreement signed at Spa, Germany managed to deliver to France, Luxemburg, Belgium and Italy 1,978,645 tons out of the 2,000,000 tons agreed upon. In fact, the Ruhr and Aachen coal districts, and the Cologne brown-coal district, all delivered slightly more than their quotas; but Upper Silesia delivered only 152,064 tons out of its quota of 180,000 tons. The cause is German-Polish enmity, which has blossomed into general disorders and strikes.

The Ruhr coal production in August was satisfactory, totaling 7,500,000 tons for 26 working days as against 7,600,000 tons for 27 working days in July, and against 6,520,000 tons in August, 1919. The figure compares badly with the last August before the war (1913), in which, with 70,000 less workmen than are to-day engaged, a production of 9,700,000 tons was reached.

Why Much Lower Prices Are Not Expected

The continuing slow rise in the foreign exchanges is attracting foreign buyers and is convincing home buyers, who hitherto held off, that no further material price drop can be expected. The present demand for iron goods is chiefly for very rapid delivery; and owing to impossibility of such delivery a great many orders are being refused. All pig iron, semi-finished steel, structural shapes and rails that are turned out are bought up immediately; also iron bars and heavy plates; but the market for tubes and thin plates continues weak.

Scandinavian countries have begun to buy, for delivery via Hamburg, for resale to Soviet-Russia; and with Belgium and France several orders of up to 15,000 tons have been received. All round works producing heavy goods are engaged up to 50 per cent of their capacity. Foreign sales are checked by the final refusal of the Government, communicated this week to the Reichstag economic committee, to abolish altogether the export duties imposed on May 10, against which all exporting industries protest on ground that they make competition with America and England impossible. The committee had unanimously petitioned the Government to abolish at least the duties on those products in which at present production cost and mark exchange Germany cannot compete in international markets.

Ore in Excess of Demand

The French prohibition against minette export to Germany was maintained throughout August. Delivery of Spanish ore was favored by the fall in freights; and Indian manganese ore was offered at a reduced price. The supply of ore exceeded the demand, and buyers showed great reserve. Scrap iron, however, upon which Germany depends in increasing measure, rose; and registered in the first September week 900 marks a ton, as against 725 on June 1, a big drop from the maximum, 2800 marks, in February.

The demand for steel rails for home railroads was small and was fully met; but several foreign orders for rails were rejected on ground that the works could not supply in time. For rolling stock the demand was very small. The great activity in the market for iron bars is ascribed to the fact that large quantities which were hoarded during the price rise period of last winter and which were later put on the market have now been absorbed. Also for bars there was a considerable demand from abroad. The demand for heavy plates was so great that the ship construction bureau refused to take further orders. The belief that the recent price reduction of wire and wire products by 500 marks a ton would reanimate the buying market was not realized. In August, as in July before the reduction, deliveries of wire declined heavily. *Eisen und Stahl* predicts a further reduction of employment in this branch.

The Rhenish-Westphalian machinery market showed a slight improvement; but increased home and foreign competition brought down prices sharply.

As a result of the reduction of prices of rolling mill products of Aug. 1 prices of many finished articles have continued to fall. The last week shows a tendency to refrain from further general price-cutting. The cause seems to be the firmness of the foreign exchanges which are associated in business men's minds with a possible resumption of the great price-rise of last winter. Also production cost is not declining.

Machine Tool Costs

The Union of German Machine Tool Manufacturers reports that in its branch, wages as compared with 1914 have risen 8 fold, and material prices between 30 and 40 fold; so that the production cost of a medium weight machine has risen between 15 and 16 fold, while that of a heavy machine has, owing to the higher ratio of material cost to labor, risen about 30 fold.

Sharp attacks continue to be made on the recently reorganized Export and Import Boards (*Aussenhandelsstellen*) on the ground of dilatory bureaucratic methods and of a price-fixing policy which fails to adapt itself sufficiently speedily to oscillations in world-market prices and in the foreign exchanges. The board's policy of fixing compulsory minimum prices for exported iron and machines has led to Germans losing many foreign orders, because the prices fixed by the boards often proved, owing to subsequent variations in the exchange, higher than those of the world-market and of Germany's competitors. Further, German firms which were compelled to sell at a fixed price in foreign currency sometimes lost heavily during the spring rise in mark exchange, which caused their foreign payments to bring them less than they had counted on. More petitions have been presented to the Government by metal, machine and engineering firms, demanding complete abolition of the boards.

The Daimler Automobile Co., which lately decided to increase its capital by 32,000,000 marks to 100,000,000 marks, announces that it will be obliged to discharge 2000 workmen, and to put the remainder on half time. The Benz Automobile Co. proposes to double its capital, and further to issue 25,000,000 marks of 5 per cent bonds, largely to meet bank debts. The Siemens & Halske Corporation announces the issue of 60,000,000 marks in 4½ per cent bonds.

The Manitowoc Shipbuilding Co., Manitowoc, Wis., is preparing to engage in the repair of locomotives and cars. Work has been started on a plant for locomotive repairs and alterations are being made in the existing machine shop and the yard trackage system.

Oil Grooving Attachment

The common practice of oiling slides in machinery is by half-round section grooves. The Hanson-Whitney Machine Co., Hartford, Conn., is manufacturing a simple mechanism for cutting V oil grooves in machine parts, which have, when a standard bar is used, a maximum length of 30 in., a maximum width of 1¼ in. and a minimum width of ⅜ in.

This mechanism can be used on any standard planer and it takes practically no longer to set it up in a planer than it does any other planer tool. The machine is furnished without holes drilled for bolts in the clapper on planers owing to the diversity of design of the latter, and it is necessary, therefore, for the purchaser to drill the holes to suit requirements. In the hook bolt there is a hole with a hardened bushing driven in. A pin, which fits the hole in the hook bolt, is inserted at the bottom of the clapper and a rigid support obtained, the clapper being firmly clamped. The bolts in the clapper box should then be tightened.

The bar cam *A*, is attached to cross piece *F*, which again is connected with upright *G*. The upright *G* is strapped to the planer table at a convenient place and the cross piece *F* is located at approximately the correct height on the upright. The cam bar can slide vertically in the cross piece and again the cross piece slides horizontally on the upright. This mechanism, therefore, gives considerable freedom of action horizontally and vertically. The blocks in the cam bar are hardened and ground, as are all surfaces subjected to rapid motions.

The small clapper box on the grooving machine can be adjusted along the reciprocating slide. The various widths of zigzags are obtained by adjusting the clapper. The bar *A* moves the slide *B*. The travel of this slide is controlled by the groove in the bar and therefore is constant. Slide *B* transmits the oscillating motion to arm *C*, which, in turn, is connected with tool slide *D*. The arm *C* is pivoted in such a way that by adjusting the bar holder *E* longitudinally the travel of the tool slide *D* can be adjusted to cut any width within the range of the appliance.

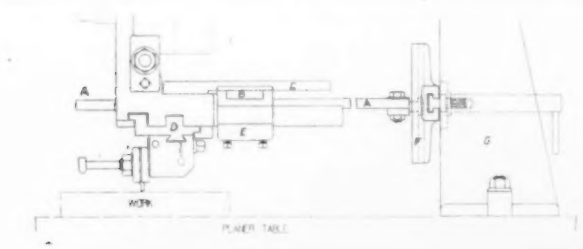
The tool holder can be adjusted at any angle, which allows for cutting in under projections when the work lies flat on the planer table. By adjusting the work and the tool holder a V-shaped groove can be cut on inverted surfaces.

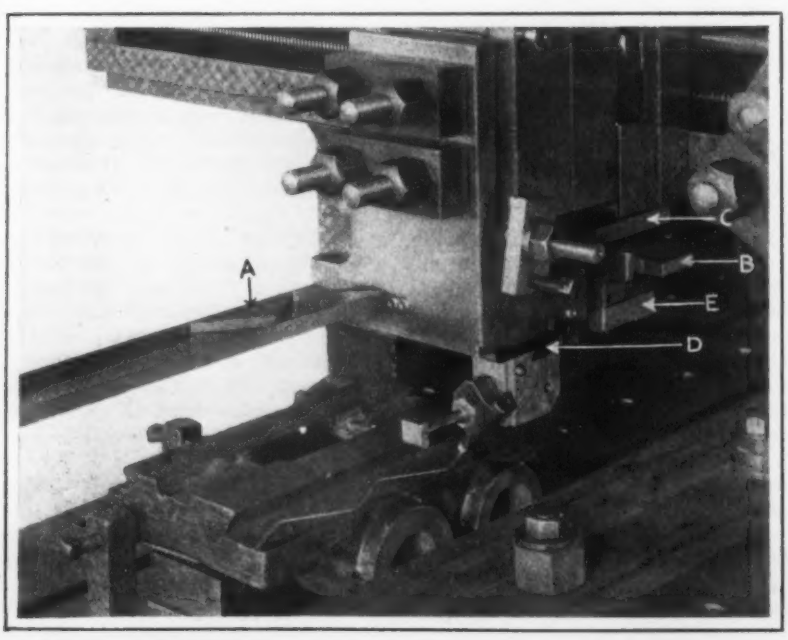
The grooving tools used are of three shapes. For work where there is no projection like a dove-tail the straight tool is used and is always located at right angles with the surface to be grooved. When a groove has to be made in a dove-tail, a right or left-hand tool is used and the tool should always swing at 45-deg. angle as it will then make the cutting angle correct. When cutting oil grooves in V-shaped slides like a planer bed or on the V part of a planer table, the whole machine is placed in position by swinging the clapper box or the vertical slide or the combination of the two. When planing grooves in a 45-deg. angle V, it is best to swing the clapper box 20 deg. and the vertical slide 25 deg.

In order that the cutting tools may be sharpened quickly and correctly a block is furnished. A grinder of the Brown & Sharpe surface grinder type or cutter grinder is convenient for this purpose. All tools furnished by the Hanson-Whitney Machine Co. are made of high-speed steel.

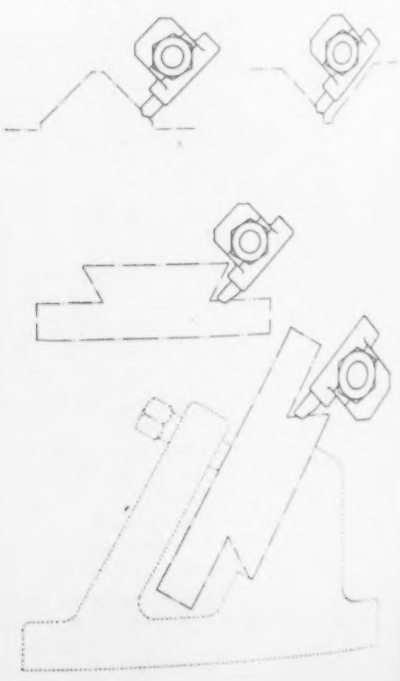
Foundations for an all-steel building 37 ft. high and 80 x 600 ft. in dimensions are being constructed on a 13½-acre site at Youngstown, Ohio, for the Commercial Shearing & Stamping Co. This building is the first unit of a new plant. It will be served by two 10-ton cranes, operating the entire length. A number of stamping machines to work material from ¼ to No. 12 gage will be installed. At this plant the company will carry warehouse stocks of various products, though its principal business will be in blue annealed sheets, cut to size. Plates, galvanized sheets, angles, beams, bars, channels and the like will be handled in addition. George C. Tinsley is general manager of the company, which is closely allied with Carnick Bros., extensive dealers in scrap metals.

The M. B. Austin Co., Chicago, is erecting a new plant on its own grounds at 108 South Desplaines Street. The building will cost approximately $150,000. It will be three stories with a floor space of 30,000 sq. ft. Foundation and walls are being made heavy enough to carry additional storage, which the company anticipates putting in as soon as building conditions are normal. There will be a washed air ventilating system.





Hanson-Whitney Planer Attachment for Cutting V Oil Grooves in Machine Parts. The capabilities of the tool for grooving surfaces at various angles are indicated in the line drawings below



Electric Furnaces and the Sulphur Problem in Cast Iron*

Electric Refining Means Better Castings and Less Manganese Consumption—Very Low Sulphur Not Necessary

BY GEORGE K. ELLIOTT

LAST year the author read two papers, "Improving the Quality of Gray Iron by the Electric Furnace," transactions of the American Electrochemical Society 35, 175-181 [THE IRON AGE, April 10, 1919]; "The Electric Furnace as an Adjunct to the Cupola," transactions of the American Foundrymen's Association 28, 352-361 [THE IRON AGE, April 8, 1920], dealing with the then widely unfamiliar subject of treating cast iron in the electric furnace. He described, for the purpose of obtaining more highly superheated and more thoroughly refined iron, a duplex or tandem process that consisted of first melting the iron in the usual way in a cupola furnace and then transferring the molten metal to an electric furnace with basic bottom where it was superheated and refined under a basic carbide slag. Inasmuch as this rigorous refining brought about, among other results, a very marked reduction in sulphur, the subject of low-sulphur cast iron was thereafter projected into considerable of the author's metallurgical life, conversation and correspondence. For it seems that about the same time Dr. Moldenke, ever the alert watchman on the mountain top, was announcing far and wide that iron foundrymen all are face to face with a sulphur problem that, snowball-like as it rolls down along the years, is acquiring a size and direful aspect that is liable to require a serious investigation almost any time, if one does not want to see the whole iron foundry business eventually swamped by the sulphur that is steadfastly mobilizing itself in the world's scrap-iron pile.

The author confesses to his indifference to this sulphur menace at the time of his papers on account of his recent experiences all having been in a foundry employing only low-sulphur pig iron and coke and no scrap iron of outside origin. However, Dr. Moldenke's well-timed remarks anent the subject directed considerable attention to the electric-furnace desulphurizing process described in the two papers mentioned and before long the author found himself a veritable question-box for inquiries about not only the process but also about the effect of sulphur in cast iron and more particularly about iron very low in sulphur such as was described in the papers. Presumptuous and entirely fruitless would it be for me to attempt an answer to the many questions hanging upon this point, but it is my intention to make this brief paper a general statement of the broader facts connected with low-sulphur cast iron and the process by which it can be obtained.

Segregations of Sulphur

The chief count against sulphur in cast iron seems to be that it is a non-metal preempting a place among real metals, a bold pretender, a counterfeit. This it has been able to do by taking on the semi-metallic semblance of the sulphide of a metal; but all the time the foundryman has never lost sight of the fact that sulphur in the form of a sulphide, be it iron sulphide, or manganese sulphide, still is a non-metal and not entitled to an important or vital place in the metal structure.

In plain unfigurative language, sulphides in cast iron break up the metallic continuity of the mass by freezing last, thereby being enabled to collect in veins along the joints between adjacent crystals of iron. This is true even of so small amounts of sulphur as below 0.05 per cent; but we are little bothered or concerned by so slight effects. However, when the sulphur content of cast iron gets to be more than 0.05 per cent it shows a most remarkable tendency to segregate in spots in a way that is liable to increase the harmful effects beyond all numerical proportion. By this it is meant that 0.15 per cent sulphur will harm cast iron through the increased tendency to segregate, more than three times as much as will 0.05 per cent sulphur. The writer's estimate would be that the evil would aggregate at least three times three times.

It is this sure tendency to segregate that in my judgment constitutes the greatest menace of high sulphur. Occasionally there is a foundryman learned, experienced and clever enough to make occasional high sulphur iron castings in which the sulphur is uniformly distributed throughout the metal; in such cases there always is widespread wonder at the unexpectedly good quality of the metal so rich in sulphur. Here the word "good" is used advisedly and only relatively. Except when certain well defined qualities such as hardness are required and can be attained by no other way, a low-sulphur iron will outshine a high-sulphur one when the full inventory of really worthy qualities is taken. By low sulphur in the preceding sentence I mean *practical* low sulphur of 0.05 to 0.075 per cent, or sulphur scant enough to be incapable of *serious* segregation.

Low Sulphur in Electric Steel

However, the basic electric furnace process that was described in the papers mentioned often produces sulphur so far below 0.05 per cent that the question is raised as to the advantages accruing from sulphur as low as 0.020 per cent, for example. In this connection I can recall one heat that emerged from the tandem process with the sulphur so far eliminated that it took a gravimetric analysis in the laboratory to discover the 0.009 per cent that constituted the remnant.

To return to the question as to the advantage of so low sulphur, academically it can be answered that the amount of non-metallic intercrystalline film breaking up to some extent the solidarity of the metal mass, is definitely reduced to a minimum that formerly was capable of expression only on paper and not in fact. Practically answering the question, it must be admitted freely that in the present state of testing and measuring the qualities of cast iron we are unable to fix positively any pronounced advantage in gray iron castings with 0.015 or 0.030 per cent sulphur, over those with twice those amounts of sulphur. However, there is a sort of speculative satisfaction and assurance in knowing that limits can be and are being achieved in every day practice that certainly are safe beyond all shadow of doubt; that the danger line at least is put a long way off. Possibly a more material advantage in this extremely low sulphur is the fact that the degree of desulphurization can be taken as a very reliable gage of the amount of general refining that has taken place in the metal bath, having in mind particularly deoxidation and degasification.

Another rather indirect but very significant benefit derived from low sulphur in cast iron is a certain independence from high or moderately high manganese. One of the reasons for the presence of this last element in cast iron is the neutralization of the evil effects of sulphur, through preventing the formation of pernicious iron sulphide by forming manganese sulphide in its stead. Frequently iron is overdosed with manganese merely to take care of anticipated high sulphur and not seldom is the surplus manganese sufficient to increase the hardness and correspondingly decrease the machinability of the castings. If the metal is known to be very low in sulphur, the manganese may be used more sparingly, with a saving not only of manganese but of machine shop finishing costs.

Low Sulphur, Less Manganese

The fact has indeed been noticed that electric furnace refined iron with low sulphur will be harder than cupola iron of the same silicon, combined carbon and manganese content and higher sulphur. This probably

*From a paper presented at the annual convention of the American Foundrymen's Association at Columbus, Ohio, Oct. 5. The author is metallurgist with the Lunkenheimer Co., Cincinnati, Ohio.

is because the manganese, relieved almost entirely of the charge of policing that bad character sulphur, is released to other activities and so goes to work forming double carbides with iron and carbon which has the effect of increasing materially the hardness of the metal. The differences in hardness probably would not be measurable or even noticeable in large castings, but that it is distinctly manifest in small ones he can aver from repeated experiences. Also this question of hardness is intermingled with the closely related subjects of the increased attraction of high-manganese irons for carbon, and of the protective influence of high manganese against oxidation in the cupola, both of which have a very considerable bearing upon the subject of hardness.

Wide Use for Scrap

Instead of striving for and accomplishing the low sulphur limits that have just been mentioned it is entirely probable that the more popular practice will be to resort to the use of more scrap or of pig irons running higher in sulphur, for example making mixtures coming from the cupola with 0.120 to 0.150 per cent sulphur or even more, and by duplexing in a basic electric furnace reducing that element to about one-half. In the finer grades of iron foundry work so great a reduction of sulphur as this would show benefits that would be practically demonstrable. It is undeniably possible to improve the general qualities of really high-sulphur cast iron by desulphurization. The more abundant widespread use of scrap is rapidly becoming not only an economic duty for the sake of the conservation of our raw materials, but also in this time of high freight rates, a well defined need. Here we have a distinctly useful application of the basic electric furnace for rendering fit for service scrap that normally is more or less unfit on account of its accumulation of sulphur.

In closing the author wishes to emphasize the reducing or deoxidizing nature of the reaction by which desulphurization is accomplished in this electric furnace process. By it getting rid of sulphur is made a double blessing; and who knows what and how many of the virtues of basic electric furnace iron are in reality due not only to low sulphur but also, and perhaps to a much greater degree, to the chemically *deoxidizing* influences by which it has been refined?

British Steel Exports Fell Off in August

British steel exports in August, this year, excluding iron ore and including scrap, were 276,083 gross tons, which compare with 393,016 tons in July and with 262,676 tons per month in the first quarter and 298,287 tons per month in the second quarter. The exports and imports thus far this year are shown by the following table in gross tons:

	Exports	Imports
January	261,248	79,024
February	231,065	71,997
March	295,716	72,491
April	274,337	71,161
May	332,869	83,431
June	287,655	131,476
July	393,016	142,428
August	276,083	92,628

The August export figures are 116,933 tons less than the July outgo and the August imports are 49,800 tons less than those for July,—a decided falling off in both cases. The total exports for the first eight months have been 2,297,252 tons as compared with 1,412,307 tons to Sept. 1, 1919. The imports to Sept. 1, 1920, have been 598,330 tons as against 279,631 tons to Sept. 1, 1919.

The following summary gives the relative exports and imports of the first quarter and first half, and for July, 1919 and 1920, as well as the average per month for 1913 and 1919 in gross tons:

	Exports	Imports
Average first quarter, 1919	147,228	44,713
July, 1919	192,466	48,099
August, 1919	212,365	41,958
Average first half, 1919	170,139	37,483
Average first quarter, 1920	262,676	74,504
July, 1920	393,016	142,428
August, 1920	276,083	92,628
Average first half, 1920	280,481	84,926
Average per month, 1913	420,757	195,264
Average per month, 1919	204,516	51,557

The trend of some of the principal exports is shown by the following data in gross tons:

	Av. Per Month, 1913	Av. Per Month, 1919	Aug., 1919	Aug., 1920
Pig iron	78,771	21,503	21,180	23 270
Steel rails	41,676	10,435	12,073	8,731
Steel plates	11,162	19,996	18,520	15,602
Steel bars	20,921	20,787	25,921	37,988
Galvanized sheets	63,506	15,508	24,395	40,042
Tin plates	41,208	24,147	33,891	31,880
Black sheets	5,679	11,109	8,491	10,338

The principal export gains in August, 1920, over August, 1919, and the 1919 monthly average have been in pig iron, steel bars and galvanized sheets. In all the above items the falling off in August as compared with July this year was pronounced, especially in pig iron, rails and galvanized sheets.

Pig iron imports in August were 14,631 tons against 8627 tons in August, 1919. The average per month in 1919 was 13,623 tons and in 1913 it was 18,059 tons per month.

Iron ore imports in August, this year, were 606,696 tons, bringing the total to Sept, 1 to 4,708,179 tons, as compared with 3,858,240 tons to Sept. 1, 1919.

Manganese ore imports in August, 1920, were 50,574 tons. These compare with 13,725 tons in August, 1919, and with 50,098 tons per month in all of 1913. The total for the first eight months of this year has been 276,163 tons against 221,005 tons to Sept. 1, 1919. The average per month in 1919 was 22,150 tons.

COAL AND COKE PRICES

Lower Quotations Expected — Unsatisfactory Railroad Conditions Continue

UNIONTOWN, PA., Oct. 4.—The car situation is again a troublesome factor in the Connellsville bituminous region, placements for the last three days of last week having been especially low. Congestion in yards and return of cars to the anthracite field after they had made their appearance in the region during the anthracite tie-up are the principal factors entering into the situation. A notable feature of the last few weeks, however, has been the appearance of new privately owned carriers in the region, it being understood that orders placed by large shippers and buyers in the spring are now being delivered by the shops.

Coal and coke prices, while somewhat variable, are showing only minor changes. Coal prices are ranging from $7 to $10.75 with line buyers showing little willingness to buy. They are anticipating a drop in the market despite the fact that much interest is being shown in the region in the threatened British coal strike. If the walkout across the water materializes, there will be a big increase in export demand and a consequent increase in price is expected. The export demand continues the key to the coal price situation and it is generally understood that heavy shipments will go forward to England if the strike there should develop.

Coke continues at practically its same level, although quotations are now around $16 and $17, with a few sales reported at $17.50. Several factors are entering into the coke price situation, according to observers here, and there is considered little prospect of an immediate break in the price. Generally unsatisfactory transportation conditions and the high price of pig iron sustained until recently are given by analysts here as the principal reasons for the sustained coke quotations, but the recent development of weakness in pig iron is likely to be reflected in the coke market.

With unsatisfactory car supply, regional production this week is low. The situation in the region is one of marking time.

Allegheny Steel & Tube Co. has again declared its regular quarterly dividend of 2 per cent, payable on the preferred stock.

TO BUILD IN SEATTLE

Orders for the Pacific Car & Foundry Co.—Chicago Company's New Warehouse

SEATTLE, WASH., Sept. 29—The Pacific Car & Foundry Co., with general offices in the Alaska Building, Seattle, and plants in that city and Portland, Ore., has received a contract from the Union Pacific Railroad for the building of 93 cabooses, and also an order from the Chicago, Milwaukee & St. Paul Railroad for heavy repair work for 500 cars, this to consist of new underframes, bolsters and draft beams, all to be furnished by the Bettendorf Co., Davenport, Iowa. The Pacific Car & Foundry Co. has started work on the building of 200 refrigerator cars for the Pacific Fruit Exchange, which is operated jointly by the Union Pacific and Southern Pacific railroads. The order for these cars was placed last January, but actual work on them has just been started. The cars will be equipped with Bettendorf underframes.

The A. M. Castle Co., Inc., of Seattle, Wash., a branch of the main house of this company at Chicago, is having plans prepared by Seattle architects for the building of a warehouse in Seattle, to measure 160 x 720 ft. It will be a one-story building of mill type construction, except that 50 feet of one end, and extending the entire depth, will be used for office purposes. The company owns an entire block in that part of Seattle where this new building is to be erected. Part of this ground, which is 446 x 1000 ft., will be used for the warehouse, while the remainder will be used for storage purposes. The new building will be served by two 5-ton electric traveling cranes, traveling its entire length. It will have a spur from what is known as the common user railroad, this line having connection with all the railroads entering Seattle. The company will carry a full line of heavy hardware, plates, structural shapes and other finished steel products in the new building. Distribution of bar, plate and structural steel and heavy hardware will be made from this plant to points in the Orient, Alaska and the Northwest. At present the company is occupying, under lease, a warehouse owned by the Oregon & Washington Railroad, but this building will be given up when the new structure is ready.

The American Hardware & Steel Products Co. has been organized at Seattle and purposes to do a general commission, importing and exporting business in iron and steel products of all kinds. The company has general offices in Seattle, Chicago and New York, and also has direct representatives in the leading cities in the Orient.

Sales agents in Seattle of Eastern sheet mills report a slight easing up in prices, and some mills are now promising deliveries in much less time than they were a few months ago. No. 26 gage, box annealed, one pass black sheets have been offered here on the basis of 6.40c. at mill, and for delivery in six weeks from date of order. No. 10 gage sheets, tank quality, have been offered here on the basis of 4.20c. at mill, this price being based on 3.50c. at mill for ¼-in. plates, to which is added an extra of 70c. per 100 lb. for No. 10 gage. Advices here are that some Eastern mills are more anxious for sheet orders than they were a few months ago.

The easing off in demand and in prices of plates at the Eastern mills is reflected here, local sales agents of the mills now offering to take plate orders at 3.25c. at mill for ¼-in. and heavier, tank quality. Very little new business in plates has developed in this district for some time, and no inquiries of moment are in the market.

The Gulowson Grei Engine Co., Seattle, builder of gas engines, has filed notice of an increase in its capital from $560,000 to $760,000. The company may make an addition to its plant.

In its bid of $82,500, the Pacific Coast Engineering Co., Seattle, has been awarded a contract for converting the Japanese built steamer Eastern Leader from a coal burning to an oil burning vessel, by the Emergency Fleet Corporation.

STEEL FOUNDRIES CO-OPERATE

To Raise Status of Steel Casting—R. A. Bull Engaged as Expert

Announcement has been made of the appointment of R. A. Bull, Pittsburgh, as consulting metallurgist for a number of prominent steel foundries grouped for the purpose of developing and perfecting higher standards in the production of steel castings. Mr. Bull will devote his entire time to preliminary research work immediately and has resigned his position as vice-president of the Duquesne Steel Foundry Co.

The members of the group are among the best known steel foundries in the country and include: Electric Steel Co., Chicago; Fort Pitt Steel Castings Co., McKeesport, Pa.; Isaac G. Johnson Co., Spuyten Duyvel, N. Y.; Lebanon Steel Foundry Co., Lebanon, Pa.; Michigan Steel Castings Co., Detroit; Sivyer Steel Castings Co., Milwaukee.

Mr. Bull is widely known in the steel castings industry as an authority in metallurgy and foundry practices, is a member of numerous technical associations and has frequently contributed to the technical press. Since 1911 he has been a director of the American Foundrymen's Association and during 1916 and 17 served two terms as its president. His connection with the foundry industry covers a period of over twenty years, during which he has held important positions in foundries at St. Louis, Chicago, New York and Pittsburgh.

All Metal Rotating Pump Valves

Pump valves designed to eliminate cutting of the seat are a new product of the Norbom Engineering Co., Fifth and Ellis avenues, Darby, Pa. The valve consists of an alloy body with a special soft metal face or lining, where it comes in contact with the seat. The under surface of the valve is cast with turbine veins, which cause it to rotate, thus to wear evenly the soft metal lining. The lining when worn can be renewed. The valves are made in sixteen sizes ranging from 2 to 6 in. in diameter.

Two Foundry Equipment Manufacturers Consolidate

The Whiting Foundry Equipment Co., Harvey, Ill., and the American Foundry Equipment Co., New York, have consolidated, the new organization to be known as the Whiting Corporation, capitalized at $5,000,000. J. H. Whiting, president Whiting Foundry Equipment Co., becomes chairman of the board, and V. E. Minich, president American Foundry Equipment Co. and of the Foundry Equipment Manufacturers' Association, will be president.

As the lines of manufacture of the component companies do not overlap, it is the intention to maintain all present manufacturing facilities. The Whiting plant at Harvey will retain the manufacture of cranes, cupolas, hoists, tumbling mills, core ovens and all other items of the Whiting line, together with sand blast equipment and dust arresters. Sand cutting machines, charging trucks, core machines and steel flasks will comprise the bulk of work at the new American plant at 2935 West Forty-seventh Street, Chicago, under the direction of E. A. Rich, Jr. Molding machines, jolts, flask specialties and pattern mounting materials will continue to be manufactured at the York, Pa., plant of the American company, in charge of R. S. Buch.

The plans include maintaining and enlarging the present offices of the American Foundry Equipment Co., 366 Madison Avenue, New York, as the Eastern sales and export office of the combined lines.

William K. Sessions, son of the late William E. Sessions, has been made president of the Sessions Foundry Co., Bristol, Conn., the Bristol Trust Co., and the Sessions Clock Co.

Slight Decrease in Iron and Steel Exports

Steel Rails and Plate Exceptions to Rule of Smaller Tonnage — Heavy Increase in Imports—Disappointing Movement of Machinery

WASHINGTON, Oct. 5.—Iron and steel exports for August, 1920, showed a slight decrease from the July, 1920, figures, both in tonnage and in valuation. The totals, however, were well above the August, 1919, figures, and in general keeping with the higher trend of the present year. The imports continued to increase.

The preliminary figures compiled by the Bureau of Foreign and Domestic Commerce show exports of iron and steel in August, 1920, of $89,065,343, against $75,826,285 in August, 1919, and $92,147,844 in July, 1920. For the eight months' period ending with August, 1920, these exports totaled $693,930,254, against $684,663,204 in the same period of 1919.

Exports, January, 1919, to August, 1920
Gross Tons

	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Total	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
July	458,866	29,647	17,243
August	431,484	22,645	20,920

The tonnage figures for iron and steel exports for August, 1920, aggregated 431,484 gross tons, against the August, 1919, total of 396,397 tons and a corrected total of 458,866 tons in July, 1920. For the eight months ending with August, 1920, the aggregate of iron and steel exports has now reached 3,134,873 tons, against 3,141,843 tons in the same eight months of last year.

The exports of iron ore in August, 1920, were 204,135 tons, in contrast with 44,899 tons in August, 1919, making a total for the first eight months of the present year of 778,248 tons, against 576,346 for the first eight months of 1919.

Imports of Iron and Steel
Gross Tons

	August		Eight Months	
	1919	1920	1919	1920
Ferromanganese	601	9,804	16,994	33,515
Ferrosilicon	1,598	1,048	4,619	10,484
All other pig iron	2,902	10,662	14,496	96,049
Scrap, including tin	22,336	24,714	101,329	110,386
Bar Iron	156	1,198	1,043	3,666
Structural iron and steel	15	183	5,173	1,033
Steel billets without alloys	165	761	4,109	17,731
All other steel billets	163	443	1,565	3,245
Steel rails	968	8,549	14,639	35,501
Sheets and plates	35	273	694	1,177
Tin and terne plates	27	49	131	271
Wire rods	20	651	119	2,621
Total	28,986	58,335	164,911	315,679
Manganese ore and oxide	8,240	99,601	249,810	334,590

Steel rails are still tending upward, showing an exportation of 56,160 gross tons in August, 1920, against 48,595 in August, 1919, and 51,869 in July, 1920. Steel plates show a similar increase in exports, aggregating 65,769 tons in August, 1920, against 54,929 tons in August, 1919, and 58,360 in July, 1920. Steel bars are almost stationary in the export figures. The August, 1920, item is 54,344 tons, against 54,264 tons in August, 1919, and 55,933 in July, 1920.

Billets, ingots and blooms totaled 20,920 tons of exports in August, 1920, against 36,163 tons in August, 1919, and 17,243 in July, 1920.

The valuation figures show a series of formidable increases compared with the figures of a year ago. The August, 1920, exports of iron ore exceeded those of August, 1919, by approximately $900,000. In nails, the increase was approximately $500,000; in cast pipes and fittings, $500,000; wrought pipes, $700,000; rails, $900,000; sheets and plates, $2,300,000; structural iron and steel, $400,000, and tin plate, $1,500,000. The pig iron exports dropped $300,000; billets, $1,500,000; car wheels, $800,000; cutlery, $500,000, and wire and manufactures of wire, $700,000.

But the outstanding increase appeared in the machinery export totals, with an increase for August, 1920, over a year ago of almost $8,000,000. The August, 1920, exports of machinery, according to these figures, aggregated $35,542,796, against $27,998,162 in August, 1919, and $37,303,838 in July, 1920. The current year shows an excess over last year's figures for the same period of $40,000,000—$294,431,093, against $254,620,424.

Exports of Iron and Steel
Gross Tons

	August		Eight Months	
	1919	1920	1919	1920
Ferromanganese	283	252	1,980	1,186
Ferrosilicon	24	31	1,379	337
All other pig iron	35,764	22,362	248,762	151,357
Scrap	4,019	37,573	11,904	121,594
Bar iron	4,143	3,566	49,323	25,934
Wire rods	9,681	12,988	87,310	90,572
Steel bars	54,264	54,344	381,403	417,631
Billets, ingots and blooms, n.e.s.	36,162	20,920	165,449	176,450
Bolts and nuts	3,227	766	29,865	25,055
Hoops and bands	3,637	2,613	38,024	34,519
Horseshoes	663	240	2,793	1,385
Cut nails	83	468	2,332	1,784
Wire nails	7,782	10,197	68,906	54,148
All other nails, including tacks	866	704	12,968	7,239
Cast-iron pipes and fittings	2,347	5,651	25,949	36,580
Wrought-iron pipes and fittings	24,937	28,385	174,676	176,060
Radiators and cast-iron house-heating boilers	539	674	2,407	4,959
Railroad spikes	1,789	1,205	19,591	10,999
Steel rails	48,595	56,160	461,804	389,965
Galvanized sheets and plates	9,876	10,219	71,341	74,653
All other sheets and plates	2,708	1,781	27,188	19,443
Steel plates	54,929	65,769	505,054	560,274
Steel sheets	14,133	12,721	128,930	104,982
Ship plates, punched and shaped	2,421	3,318	9,081	28,682
Structural iron and steel	32,943	36,603	273,664	273,268
Tin and terne plates	9,251	16,424	141,436	156,415
Barb wire	9,443	8,000	61,362	80,151
All other wire	21,688	15,550	136,962	109,808
Total	396,397	431,484	3,141,843	3,134,873

The exports of engines and engine parts for August, 1920, aggregated $12,437,703, against $7,890,549 in August, 1919. These exports have now reached almost $100,000,000 for the current year, the eight months' total being $98,106,481, against $80,439,895 for the same period a year ago.

The exportation of pig iron showed a drop to 22,645 tons in August, 1920, from the August, 1919, total of 35,764. This is in keeping with the previous figures, for the first eight months of 1920 showed a total of 152,880 tons, against 252,121 tons for the same period of last year.

Exports of Machinery

	August		Eight Months	
	1919	1920	1919	1920
Adding machines	$274,209	$336,557	$2,822,443	$3,576,021
Air-compressing machinery	287,915	414,864	2,614,507	3,529,875
Brewers' machinery	9,968	42,170	146,731	295,731
Cash registers	224,050	462,384	2,308,404	4,123,446
Parts of	16,821	24,069	174,027	311,226
Concrete mixers	15,977	66,028	128,199	473,194
Cotton gins	24,401	78,567	271,820	344,032
Cream separators	135,504	72,672	799,501	810,508
Elevators and elevator machinery	147,526	50,959	2,223,672	952,022
Electric locomotives	27,215	1,645	237,458	844,130
Gas engines, stationary	81,552	38,406	424,249	516,157
Gasoline engines	2,677,808	2,124,529	23,604,861	24,829,941
Kerosene engines	578,125	717,255	5,695,917	6,906,428
Steam engines	1,807,861	5,986,744	19,210,065	40,466,474
All other engines	235,146	500,414	2,601,788	3,167,410
Boilers	570,878	984,459	3,933,856	4,401,470
Boiler tubes	485,559	513,439	6,537,402	3,218,644
All other parts of engines	1,426,405	1,571,412	18,194,299	13,755,827
Excavating machinery	45,315	312,112	939,805	1,236,510
Milling machinery, flour, grist	123,144	116,181	913,508	1,071,941
Laundry machinery, power	64,699	65,936	308,436	772,123
All other	28,202	46,822	151,323	481,135
Lawn mowers	26,695	22,155	343,209	251,410
Lathes	775,434	414,604	7,371,420	5,491,216
Other machine tools	915,469	972,247	8,877,002	9,218,593
Sharpening and grinding machines	314,987	278,864	4,027,674	2,812,170
All other metal working machinery	1,843,253	1,242,778	21,329,033	12,898,922
Meters, gas and water	45,955	34,026	513,400	471,433
Mining machinery, oil well	411,276	463,623	2,512,094	3,304,618
All other	733,703	608,222	7,016,908	5,881,590
Paper-mill machinery	389,918	207,865	2,885,061	1,436,824
Printing presses	326,893	654,626	2,321,122	5,639,717
Pumps and pumping machinery	633,731	959,113	5,834,644	7,976,021
Refrigerating and ice-making machinery	159,638	273,432	1,575,172	2,388,749
Road-making machinery	61,576	44,673	586,158	829,390
Sewing machines	946,908	896,871	8,520,511	10,872,912
Shoe machinery	208,822	152,647	1,766,622	1,448,662
Sugar-mill machinery	1,192,754	1,328,292	7,051,785	8,827,201
Textile machinery	1,753,168	2,424,976	10,070,075	12,833,189
Typesetting machines	212,878	321,568	2,942,016	3,209,988
Typewriting machines	1,418,442	1,614,654	11,451,499	17,556,873
Windmills	125,092	191,375	731,030	1,237,565
Wood-working machinery, saw mill	46,816	61,187	929,194	728,490
All other	302,201	206,568	1,655,645	2,394,663
All other machinery and parts of	5,864,273	7,641,406	49,278,589	60,636,652
Total	$27,998,162	$35,542,796	$254,620,424	$294,431,093

The exports of metal working machinery continue disappointing, the August, 1920, total of the various items aggregating $2,908,493, against $3,849,143 in August, 1919, and $3,676,592 in July, 1920. The first eight months of the current year represents a total of only $30,420,901, against $41,605,129 for the first eight months of 1919.

Textile machinery exports in August, 1920, aggregated $2,424,976, against $1,753,168 in August, 1919, and $1,194,880 in July, 1920.

The imports of iron and steel for August, 1920, show a total more than twice as great as the figures for August, 1919, and almost twice as large as those for July, 1920. The tonnage of these imports for August, 1920, was 58,335 gross tons, against 28,986 in August, 1919, and 31,863 in July, 1920. These imports represent a value of $6,544,925 in August, 1920, against $1,623,426 in August, 1919, and $5,209,999 in July, 1920. For the eight months ending with August, 1920, they aggregated $33,820,363, against $15,033,634 for the same period of last year.

The imports of machinery in August, 1920, aggregated $1,041,707, against $286,037 for August, 1919. For the eight months period of 1920 they aggregated $5,359,516, against $2,497,528 a year ago.

The imports of manganese ore and oxide of manganese aggregated 99,601 tons in August, 1920, worth $2,265,943, against 8240 tons in August, 1919, worth $250,692. For the eight months ending with August, 1920, they totaled 334,590 tons at a value of $7,543,424, against 249,810 tons, worth $8,759,925, for the same period of 1914. O. F. S

Representatives on American Engineering Council

Representatives of the American Society of Mechanical Engineers on the American Engineering Council, the governing body of the newly created Federated American Engineering Societies, have been appointed. The delegates will hold office for two years beginning Jan. 1, 1921, and will also represent the society at the organization meeting of the American Engineering Council to be held at Washington, Nov. 18 and 19. The list of representatives appointed follows:

L. P. Alford, formerly editor *Industrial Management*; E. S. Carman, secretary and chief engineer Osborn Mfg. Co., Cleveland; R. H. Fernald, professor mechanical engineering, University of Pennsylvania, Philadelphia; A. M. Greene, Jr., professor mechanical engineering, Rensselaer Polytechnic Institute, Troy, N. Y.; W. B. Gregory, professor experimental engineering, Tulane University, and irrigation engineer, U. S. Department Agriculture, New Orleans; W. A. Hanley, master mechanic and chief engineer, Eli Lilly & Co., Philadelphia; D. S. Kimball, dean of College of Engineering, Cornell University, Ithaca, N. Y.; Charles T. Main, consulting engineer, Boston; Fred J. Miller, president of the society; L. C. Nordmeyer, secretary and treasurer Tait & Nordmeyer Engineering Co., St. Louis; V. M. Palmer, engineer of industrial economy, Eastman Kodak Co., Rochester, N. Y.; H. P. Porter, superintendent gas department, Gypsy Oil Co., Tulsa, Okla.; Arthur L. Rice, managing editor *Power Plant Engineering*, Chicago, and Paul Wright, engineer and contractor, Paul Wright & Co., Birmingham.

Management Section

A letter ballot recently taken for the purpose of selecting officers for the management section of the society has resulted as follows: Chairman, L. P. Alford; vice-chairman, L. W. Wallace, Baltimore; executive committee, Frank B. Gilbreth, C. E. Knoeppel and S. E. Thompson; secretary, W. H. Greul.

Mechanical Engineers to Celebrate

The American Society of Mechanical Engineers plans to signalize the fortieth anniversary of its founding on Nov. 5, 1880, by providing for the holding simultaneously on Nov. 5 this year of 40 sectional meetings of the society membership. Plans contemplate the use for the occasion, if it is possible to do so, of the radio-telephone, probably transmitting speeches of the presidents of the four national engineering societies of mechanical, mining, civil and electrical engineers.

PIG IRON PRODUCTION

Value Shows Large Percentage of Nation's Metallic Output in 1919

WASHINGTON, Sept. 28.—Although the country's production of pig iron dropped from 39,054,644 in 1918 to 31,015,364 in 1919, according to the statistics of the American Iron and Steel Institute, the preliminary summary prepared by the United States Geological Survey reveals the fact that pig iron represented 59 per cent of the total value of the nation's metallic products in 1919 against 55 per cent in 1918.

This summary of "The Mineral Resources of the United States" puts the total value of the 1919 metallic production at $1,372,770,000 against $2,152,919,000 in 1918, a decrease of $780,149,000 or 36 per cent.

The pig iron production in 1919 is valued at $809,246,000 against $1,180,759,565 in 1918. This represents a reduction of $371,514,000—31 per cent.

The output of iron ore in 1919 aggregated 56,319,000 gross tons worth $203,274,000 against 72,021,202 tons in 1918, worth $244,368,147. The 1919 figures show a decrease of $15,702,000 tons or 22 per cent, and the valuation decrease is $41,094,000 or 17 per cent.

The total value of the mineral products of the United States for 1919 is estimated by the summary as having been $4,653,700,000, a decrease of $884,999,000 or 16 per cent from the 1918 record of $5,538,699,000.

"Statistics of mineral production in the United States," says the introduction to the summary, "revealed a reaction from the intensive production for war purposes and the unsettled state of industry in general. Production of special 'war minerals' rapidly subsided, although not to its pre-war status. These minerals, however, even under the stimulation of war demand, had contributed only a very small part to the country's mineral production. The principal decline was due to a diminished production of coal and the major metals.

Ore and Iron Declined

"Iron ore declined 13 per cent and pig iron 21 per cent in output, owing in part to the poor demand for structural materials in the first part of 1919, but largely to the steel and coal strikes in the last part of the year.

"Among the minor metals, the output of manganese was favored during the first six months of 1919 by war contracts; but when these terminated, producers could find no market. The markets for tungsten, chromium, and other minor metals used for ferroalloys, were also insignificant, and the stock already accumulated has brought production of these metals to a standstill.

"Production of coke, especially beehive coke, underwent a great slump after the armistice was signed, keeping pace with the decline in production of pig iron. The most noteworthy feature of the coke industry was that, whereas the production of beehive coke declined 36 per cent, that of by-product coke declined only 3 per cent, and for the first time exceeded that of beehive coke. The year 1919 may therefore be called a turning point in the history of coke manufacture in the United States.

"Refractory materials as a whole declined with the decline of the iron and steel and other metallurgic industries. The magnesite situation, however, notwithstanding a decline of nearly 30 per cent in production, has been encouraging, as imports expected in the first six months of 1919 have not yet been received, and domestic production has, therefore, recovered.

"The unsettled state of the mineral industries in 1919 expressed in this résumé has shown no tendency to improve up to June, 1920, and, with a presidential campaign just beginning, the prospects of stabilizing industry are none too bright. The data in the tables of this report show, however, that with the exception of the 'war minerals' most commodities are below normal in output. Marked increases in production are therefore to be expected in 1921 and succeeding years until normal output is reached."

The summary also presents an interesting comparison in production for the years 1913 and 1919, with a recalculation of the 1919 output on the basis of the 1913 prices. There is a striking similarity in the figures, for these two years, on iron ore and pig iron. The 1913 output of iron ore was 59,643,098 tons, worth $130,905,558. The 1919 production was 56,319,000 tons worth (at the 1913 average price of $2.19 per ton) $123,338,610.

The pig iron output for 1913 was 30,388,935 tons, an average of $15.08 per ton. The 1919 production was 30,646,000 tons, the valuation of which at the 1913 prices was $462,141,680.

IRON ORE.

Iron ore mined in the United States, by mining districts and varieties, 1918 and 1919, in long tons.

District.	1918 Hematite.	Brown ore.	Magnetite.	Total.	1919 (estimate) Total.	Percentage of decrease.
Lake Superior[a]	59,779,794	.....	.....	59,779,794	52,003,000	13
Birmingham	4,763,057	344,332	.....	5,107,389		
Chattanooga	516,259	309,268	.....	825,527		
Adirondack	.....	.....	762,029	762,029		
Northern New Jersey and southeastern New York	.....	.....	523,862	523,862	8,463,000	14
Other districts	835,599	960,244	863,834	2,659,677		
	65,894,709	1,613,844	2,149,725	69,658,278	60,466,000	13

[a]Includes only those mines in Wisconsin which are in the true Lake Superior district.

Iron ore mined in the United States, by varieties, 1913-1919, in long tons.

Year.	Hematite.	Brown ore.	Magnetite.	Carbonate.	Total.
1913	57,933,251	1,682,063	2,357,274	7,849	61,980,437
1914	38,286,670	1,537,750	1,610,203	5,138	41,439,761
1915	52,227,324	1,488,709	1,807,002	3,455	55,526,490
1916	76 728,024	1,904,484	2,533,364	1,800	75,167,672
1917	70,743,513	1,992,332	2,553,006	....	75,288,851
1918	65,894,709	1,613,844	2,149,725	....	69,658,278
1919 (estimate)	.....	.....	.....	....	60,466,000

Financing of Bethlehem Corporation's Ore Boats

To finance the construction of five new ore boats the Bethlehem Steel Corporation sold to bankers about $20,000,000 15-year 7 per cent marine equipment bonds. Active trading in the bonds on a when-issued basis took place on the curb market recently, the initial sales being at 94⅞ and 95. By the close of the day sales were made at 94½ and the issue had been more than two and a half times subscribed. The boats will bring ore from the company's mines in Chile and will increase the corporation's steamship fleet from 52,000 to 152,000 tons.

Some of the vessels for which new funds are being raised are completed and others are now under construction. The banking syndicate includes the Guaranty Trust Co., the Bankers' Trust Co., J. & W. Seligman & Co. and the Chase Securities Co.

Decreased Production of Iron and Steel

Effect of Steel Strike and Other Unfavorable Conditions is Shown, But Gains Were Made in Output of a Number of Products

THE effect of the steel strike of last fall and of other unfavorable conditions is shown in the reduced production of nearly all kinds of iron and steel last year, as shown by the statistics compiled by the American Iron and Steel Institute. The production of all kinds of iron and steel rolled into finished forms in 1919 shows a decrease of 6,054,210 tons, or 19.43 per cent, as compared with 1918.

It will be noted that the production of steel ingots and castings declined from 44,462,432 tons in 1918 to 34,671,232 tons in 1919, the smallest output since 1915.

The production of tinplate and terne plate declined from 3,301,624,244 pounds in 1918 to 2,578,011,487 pounds in 1919.

Plates and sheets combined show a loss, but galvanized sheets are reported separately and show a gain. The production for 1919 being 1,641,070,432 pounds compared with 1,280,889,074 in 1918.

The production of cut and wire nails shows an increase compared with the preceding year, the production for 1919 being 13,094,221 kegs compared with 12,279,800 in 1918. The production of nails for the past two years was, however, much below that of the preceding three years, the figures being as follows: 1915, 14,583,026; 1916, 17,147,665; 1917, 17,040,666. The export movement last year showed a comfortable increase, it being 2,011,045 kegs compared with 1,763,460 in 1918.

The production of cut nails was only 394,477 kegs, the smallest output in the record dating back to 1890, when the production was 5,640,946 kegs. A slight increase is shown in pipes and tubes, the totals being 2,290,479 tons for 1918 and 2,374,931 tons in 1919. Of this increase, a large part was due to the strong demand for oil country goods, of which the production in 1919 was 1,068,914 tons compared with 794,769 tons in

(*Continued on page 955*)

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth. Basic.	Open-hearth. Acid.	Open-hearth. Total.	Bessemer.	Crucible.	Electric.	Miscellaneous.	Total. Gross tons.
1905	7,815,728	1,155,648	8,971,376	10,941,375	102,233	.....	8,963	20,023,947
1906	9,658,760	1,321,653	10,980,413	12,275,830	127,513	.....	14,380	23,398,136
1907	10,279,315	1,270,421	11,549,736	11,667,549	131,234	.....	14,075	23,362,594
1908	7,140,425	696,304	7,836,729	6,116,755	63,631	.....	6,132	14,023,247
1909	13,417,472	1,076,464	14,493,936	9,330,783	107,355	13,762	9,185	23,955,021
1910	15,292,329	1,212,180	16,504,509	9,412,772	122,303	52,141	3,194	26,094,919
1911	14,685,932	912,718	15,598,650	7,947,854	97,653	29,105	2,844	23,676,106
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309	2,853	31,251,303
1913	20,344,626	1,255,305	21,599,931	9,545,706	121,226	30,180	3,831	31,300,874
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232

PRODUCTION OF STEEL INGOTS.

1905	7,609,569	835,267	8,444,836	10,919,272	96,500	.....	2,572	19,463,180
1906	9,345,212	915,310	10,260,522	12,243,229	117,170	.....	3,510	22,624,431
1907	9,912,839	890,372	10,803,211	11,634,276	121,001	.....	989	22,559,477
1908	6,985,420	539,532	7,524,952	6,096,196	55,360	.....	519	13,677,027
1909	13,111,467	781,429	13,892,896	9,296,969	94,672	13,456	786	23,298,779
1910	14,858,353	782,805	15,641,158	9,354,437	107,671	50,821	.....	25,154,087
1911	14,419,306	608,153	15,027,459	7,890,753	83,623	27,227	417	23,029,479
1912	19,197,504	712,371	19,909,875	10,259,151	100,967	14,147	542	30,284,682
1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	847	30,280,130
1914	15,936,985	633,382	16,570,367	6,154,964	78,683	15,456	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,345	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,048	302	41,401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219	43,051,022
1919	25,405,347	780,827	26,186,174	7,172,743	62,563	272,942	373	33,694,795

PRODUCTION OF STEEL CASTINGS.

1905	206,159	320,381	526,540	22,103	5,733	.....	6,391	560,767
1906	313,548	406,343	719,891	32,601	10,343	.....	10,870	773,705
1907	366,476	380,049	746,525	33,273	10,233	.....	13,086	803,117
1908	155,005	156,772	311,777	20,559	8,271	.....	5,613	346,220
1909	306,005	295,035	601,040	33,814	12,683	306	8,399	656,242
1910	433,976	429,375	863,351	58,335	14,632	1,320	3,194	940,832
1911	266,626	304,565	571,191	57,101	14,030	1,878	2,427	646,627
1912	443,998	426,850	870,848	68,750	20,550	4,162	2,311	966,621
1913	460,161	450,056	910,216	80,506	17,571	9,207	3,344	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years.	Ingots.	Castings	Total.	Years.	Ingots.	Castings	Total.
1909	158,978	23,002	181,980	1915	923,251	97,896	1,021,147
1910	538,462	29,357	567,819	1916	1,306,157	56,458	1,362,615
1911	425,169	56,290	481,459	1917	1,576,806	67,529	1,644,335
1912	689,392	103,109	792,501	1918	1,721,367	66,485	1,787,852
1913	695,430	88,927	714,357	1919	1,435,816	45,372	1,481,188
1914	577,107	69,846	646,953	.....	.....	.....	.....

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS, BY PROCESSES, GROSS TONS, 1919.

Processes.	Ingots.	Castings.	Total.
Open-hearth steel—basic	1,056,137	2,850	1,058,987
Open-hearth steel—acid	114,923	22,903	137,826
Bessemer steel	66,581	13,503	80,084
Crucible steel	22,600	50	22,650
Electric and miscellaneous steel	175,575	6,057	181,632
Total	1,435,816	45,372	1,481,188

In 1919 there were 141 works in 24 States and the District of Columbia which made alloy steel ingots or castings.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, 1887–1919.

Years	Iron and steel rails	Plates and sheets	Nail plate	Wire rods	Structural shapes	All other finished rolled products	Total. Gross tons.
1887	2,139,640	603,355	308,432	.....	.....	2,184,279	5,235,706
1888	1,403,700	609,827	289,891	279,769	.....	2,034,162	4,617,349
1889	1,522,204	716,496	259,409	363,851	.....	2,374,968	5,236,928
1890	1,885,307	809,981	251,828	457,099	.....	2,618,660	6,022,875
1891	1,307,176	678,927	223,312	536,607	.....	2,644,941	5,390,963
1892	1,551,844	751,460	201,242	627,829	453,957	2,579,482	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,570	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,487,845	6,189,574
1896	1,122,010	965,776	72,137	623,986	495,571	2,236,361	5,515,841
1897	1,647,892	1,207,286	98,054	970,736	583,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,683	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,665,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,095,813	4,952,185	13,207,697
1904	2,284,711	2,421,398	61,601	1,099,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,537,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,063,181	4,311,608	11,828,193
1909	3,023,845	4,234,346	63,746	2,335,685	2,275,562	7,711,506	19,644,690
1910	3,636,031	4,955,484	45,294	2,241,830	2,266,890	8,475,750	21,621,279
1911	2,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,875,080	45,331	2,653,553	2,846,487	9,908,475	24,656,841
1913	3,502,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,196
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544

GREATER EFFORT URGED

President Farrell in Discussing Foreign Trade Indicates One Way of Preventing Depression

The excess profits tax and income taxes required of Americans resident abroad as an obstacle to export trade were discussed at the annual meeting of the National Foreign Trade Council, Sept. 30, at the Biltmore Hotel, New York. In his opening speech, Chairman James A. Farrell, president United States Steel Corporation, urged a more active interest in export trade on the part of American producers.

"In every business," said Mr. Farrell, "there is a part of the production, roughly estimated as the last 20 per cent, which cannot remain unsold if the first 80 per cent of the sales are to prove profitable. Remove this last 20 per cent and the whole operation will cease to show a profit. So it is with the present productive capacity of the United States; a certain volume of foreign sales must be maintained or the industry of the country will suffer throughout.

"In recent months we have seen various degrees of depression in our business, resulting largely from decreased domestic demands. Such a depression might in part have been avoided had our producers shown more desire to add the demands of an understocked world to those of local markets in the United States."

Mr. Farrell urged a serious effort on the part of business men to obtain a permanent foreign trade. "They must be induced to equip themselves for foreign trade," he said; "to devote some portion of their products to foreign trade; and to demand of the Government that willing support of legitimate enterprise to which they are entitled. Other nations are older in the field; some control cables, coaling stations, harbor privileges, banking facilities, railroad and shipping systems. It is doubtful whether American private enterprise can at this late date obtain similar facilities unaided.

"If, however, we can obtain from the legislative and executive branches of the Government an understanding of these problems with which we are faced, I am confident that the American business man can meet this foreign competition, if only he appreciates the real need for foreign trade which this country is now experiencing."

Mr. Farrell was again elected chairman of the council; Robert H. Patchin, W. R. Grace & Co., was re-elected treasurer, and O. K. Davis secretary for the ensuing year.

Members in attendance included: E. A. S. Clarke, president Consolidated Steel Corporation; J. G. Culbertson, president Wichita Motors Co., Wichita Falls, Tex.; P. A. S. Franklin, president International Mercantile Marine; John D. Ryan, president Anaconda Copper Mining Co.; M. A. Oudin, vice-president International General Electric Co.; Maurice Coster, vice-president Westinghouse Electric International Co.; W. L. Saunders, chairman of the board, Ingersoll-Rand Co.; J. R. Flannery, president Vanadium Metal Co., Pittsburgh; Robert H. Patchin, W. R. Grace & Co.

With several cities contending to be selected for the Eighth National Foreign Trade Council Convention, Cleveland was decided upon for 1921, it being felt that an inland city in the East should be selected for the next meeting, as the 1920 convention was held in San Francisco.

PLENTY OF COAL

National Coal Association Believes Supply Will Be Ample

WASHINGTON, Oct. 5.—The coal situation has improved to such an extent that the National Coal Association now gives assurance that there will be plenty of coal for all needs after Dec. 1. Until that date, when the navigation season closes, the Interstate Commerce Commission's priority order diverting coal to Lake Erie ports for transshipment by water to states at the head of the Lakes will remain in effect. Officers of the National Coal Association say that if consumers will show no disposition to hoard coal this fall and will buy only what they need, there will be sufficient to carry them to Dec. 1, after which all possibility of a shortage will be passed.

It is the purpose of the National Coal Association as announced by its spokesmen to run the weekly production of bituminous coal up to 12,000,000 tons a week for the remaining weeks until Dec. 1. The latest report of the Geological Survey shows that the bituminous coal produced during the week ended Sept. 18 totaled 11,614,000 net tons. This was the largest production, with one exception, in any week since January. It was an increase when compared with the latest full time week, Aug. 31 to Sept. 4, of 447,000 tons, or four per cent, and was within 199,000 tons of that for the week of Aug. 14, the largest obtained since last January. One factor in the increased output of bituminous coal was the release of cars from the anthracite region of Pennsylvania, where a strike was in progress, for use in adjacent bituminous fields.

The question of a car supply is the one factor that keeps bituminous coal production down. Railroad officials, however, say that the traffic situation has improved to such an extent that they believe all needs will be met.

Until Dec. 1 the steel industry must continue to be hampered because of the lack of open top cars. The order confining the use of open top cars, except those with sides of less than 38 in. in height, to coal will remain in effect presumably until the close of the navigation season. After that time, it is expected that the open top car order will be lifted and cars then can be diverted to the use of the steel and other industries which have suffered severely because of inability to move their manufactured products during the summer.

The National Coal Association estimates that the New England demands for the remainder of the year will be met without further resort to preferential shipments, the priority order for the movement of coal through tidewater ports to New England having been suspended two weeks ago.

The output of beehive coke declined eight per cent during the week ended Sept. 18. The total production is estimated at 402,000 tons as against 438,000 tons during the week before, and 449,000 tons in the corresponding week of 1919. The principal factors in the decrease were a less adequate car supply in Pennsylvania and the coal miners' strike in Alabama.

American Iron and Steel Institute Meeting

The eighteenth general meeting of the American Iron and Steel Institute will be held at the Hotel Commodore, New York, Friday, Oct. 22. The address of the president will be delivered by Elbert H. Gary, chairman of the United States Steel Corporation, and it is expected to be of great interest. Judge Gary, upon his return from Europe last Sunday, said he would reserve making any statements in regard to conditions in Europe until the meeting of the institute. Following the reading of Judge Gary's address, papers will be read as follows:

Thrift in Coal—George Otis Smith, director, United States Geological Survey, Washington.

Recent Developments in the Iron and Steel Industry of India—C. P. Perin, New York.

Foreign Trade—A. H. Holliday, manager of exports, Jones & Laughlin Steel Co., Pittsburgh.

The Basic Open Hearth Process—F. L. Toy, superintendent open hearth department, Homestead Works, Carnegie Steel Co., Munhall, Pa.

A Review of the Development of Copper Steel—D. M. Buck, metallurgical engineer, American Sheet & Tin Plate Co., Pittsburgh.

The Use of Residual Manganese in Steel Making—E. A. Wheaton, superintendent open hearth department, Bethlehem Steel Co., Bethlehem.

Heat Treatment of Automobile Steels—R. R. Abbott, Peerless Motor Car Co., Cleveland.

The Blast Furnace Hearth—Walther Mathesius, superintendent blast furnaces, Illinois Steel Co., South Chicago, Ill.

Dry Air Blast at British Furnaces

Unfavorable Views Expressed at the Iron and Steel Institute's Cardiff Meeting—Electrostatic Cleaning of Gas at Skinningrove—Quality of Electric Steel

(*Special Correspondence*)

CARDIFF, SOUTH WALES, Friday, Sept. 24.—The autumn meeting of the Iron and Steel Institute which began here on Sept. 21 and concluded to-day—the first meeting to be held out of London since the Brussels meeting of 1913—has proved of the greatest value and interest, both as regards the papers discussed and the local hospitality and visits to works. About 600 members and visitors attended, among whom may be mentioned H. A. Brassert, Chicago; J. Cohade, Le Creusot, France; A. Danielsson, Bofors, Sweden; C. F. Delfos, Pretoria, South Africa, and R. Quijano de la Colina, Santander, Spain.

Besides social functions, visits were arranged to the following works, among others: the Dowlais Cardiff Works of Guest, Keen & Nettlefolds, Ltd., the works of the Ebbw Vale Steel, Iron & Coal Co., Ltd., the Chepstow shipyards of the Monmouth Shipbuilding Co., the new Margam Iron & Steel Works of Baldwins, Ltd.; a number of docks, also various works in the Swansea district engaged in the manufacture of copper, spelter, tin and galvanized sheets, and weldless tubes.

At the opening session on Sept. 21, held at the South Wales Institute of Engineers, the chair was taken by the president, Dr. J. E. Stead.

Electrification of Ebbw Vale Works

A paper on "The Electrification of the Works and Collieries of the Ebbw Vale Steel, Iron & Coal Co., Ltd." was read by the author, Walter Dixon, Glasgow, technical adviser to the company. At present the properties owned or under the company's control extend almost continuously over an area of 15 miles north and south and 4 miles east and west, and there is a continued and ever-increasing demand for power. At present the units generated per annum may be taken at 45 millions, which will probably be increased in the immediate future to 60 millions. The generating steam plant installed may be taken at 22,000 kw., and the units generated at Ebbw Vale exceed those of the South Wales Power Distribution Co. or the combined outputs of the four local corporation installations of Cardiff, Newport, Swansea, and Llanelly. The electrical plant may be approximated as follows:

Generating plant having a combined output of..22,000 kw.
Over 50 transformers having a combined output of 31,000 kva.
Over 500 motors having a combined output of....30,000 hp.
Converters having a combined output of..... 2,500 kw.

The principal power station at Victoria is equipped with four turbo alternators, two of 2000 kw., and two of 5000 kw. A third 5000-kw. set is in process of completion. Steam alone is used for power generation, the gas-fired boilers being in close proximity with the generating station, and connected with the main battery of boilers which supplies the blast furnace equipment. While at present some coal is used, it is estimated that with the completion of the scheme in hand, there will be a margin of 10,000 to 14,000 h.p. available for electrical generating purposes, after the steam requirements of the blast furnaces have been met.

The alternating current is generated at 2000 to 2200 volts, three-phase, with a periodicity of 50, and the turbines are arranged for a steam pressure of 175 lb., with superheat. The condensing plant is arranged on the "Tinsley" system, plants being driven both electrically and by steam.

Direct current is generated at 250 to 275 volts from four high-speed engine sets of about 200 h.p. each, these sets comprising the original installation, and one mixed pressure turbine generating plant, having an output of 600 h.p. The station also contains motor generators for supplying current in bulk to the Ebbw Vale Urban District Council, which utilizes the current for lighting and other purposes in the town of Ebbw Vale and its immediate area. The direct current supply is supplemented to the steel works area by motor and rotary converters to the extent of 2500 kw. There are also three colliery power stations.

CURRENT DISTRIBUTION

As regards distribution the installation roughly divides itself into two systems, that to the north covering the iron and steel plant and that to the south the collieries. Direct current is taken to the steel works from Victoria by overhead cables to a distribution house. The alternating current is taken from the switchboard in the generating station to a main substation and is distributed to the northern area at 2200 volts on a ring main system with balanced protective gear. From various substations current is delivered at full and also at 500 to 550 volts for general purposes.

In the main, the transmission lines are erected on the overhead system, though in places it has been necessary to adopt underground cable. In the case of the steel works, H poles of the ordinary type have chiefly been employed. For dealing with the collieries the lines are fixed on poles, and are of a type suitable for dealing with the voltage concerned, which is 20,000.

Throughout the steel works electrical power is used for the following departments: Sheet mills, dolomite plant, steel works, upper mills, Ebbw Vale blast furnaces, spring and wagon shops, tube works, coke ovens, Victoria colliery by-product plant, gas-cleaning plant, engineering shops and foundry, Victoria blast furnaces. At the collieries electrical power is employed for pumps, winders, ventilating fans and air compressors.

Intercrystalline Fracture in Mild Steel

The paper on the above subject, by Walter Rosenham and D. Hanson, deals with some exceptional cases of fracture in mild steel in which the fracture has occurred by the separation of one crystal from another instead of by the breaking across of the ferrite crystals, as is usually the case. Apart from any theoretical explanation, the fact that such fracture can occur under special circumstances is of great importance to users of mild steel, particularly those concerned with high pressure steam boilers.

The first case is that of steel wrapper plates from the combustion chamber of a marine boiler, which showed severe cracking around the edges between the rivet holes.

The second case is that of a mild steel plate, half an inch thick, from the drum of a water-tube boiler, which had also cracked round the edges, starting from the rivet and holes. This process appears to have continued until the plate was no longer able to withstand the working pressure of the boiler, which at that stage exploded.

The third case is that of a fractured steel wrapper plate, two butt straps and a cover plate from a high-pressure marine boiler. The plates were one inch thick, and cracking had occurred around and between the rivet holes at one of the seams of the boiler where the rivets passed through the wrapper plate, two butt straps and a cover plate, a thickness of 4 in. in all. It was thought that the intercrystalline character of the fracture might have arisen from some peculiar weakness in the steel itself, particularly as it has been suggested that once a crack is started in mild steel it may tend to propagate itself along the crystal boundaries. In order to test this point a special experiment was carried out with a nicked test piece of crooked form under slow loading, but the resulting crack showed no tendency whatever to assume an intercrystalline character. This result suggests that in order to produce an intercrystalline crack the stress must operate for a period of years rather than a few hours.

The fourth case occurred in a piece of mild steel tubing after six months intermittent service without working stresses in a niter bath at a temperature of 300 deg. C.

SIMILAR TO "SEASON CRACKING"

Details are given in the paper of the examination of the steels in the above cases. The cracks, especially in the last case, show a striking resemblance to those

found under certain conditions in a number of non-ferrous metals and alloys, the most familiar example being "season cracking" in ordinary brass.

The steel as supplied in the form of flat plates was probably free from any serious internal stresses, and even the internal stresses set up by the bending of the plates can hardly be held responsible for the failures. In the process of constructing the boiler itself, however, operations are carried out which may easily lead to the establishment of very serious internal stresses. During the process of riveting, if the edges of the plate do not fit together accurately, or if the rivet holes do not register exactly, the material is forced into position and held there by the rivets. Further, the action of riveting itself may leave considerable stresses in the material in the immediate neighborhood of the rivet holes, particularly if the pressure employed in closing the rivet has been very great. In the third example the material was in some cases seriously depressed under the rivet heads, indentations as much as 1/16 in. below the general surface of the plate being found. The riveting pressure in such cases has been very great and must have left considerable stress both in the material of the plate and in the rivet itself.

INFLUENCE OF CHANGE IN TEMPERATURE

The cases described in the paper in regard to steels have all occurred when the article in question has been exposed for a considerable period to a slightly elevated temperature. Up to the present time the authors have not observed a fracture of this kind which has occurred in a steel article which has been exposed to stress at the ordinary temperature only.

The authors consider that corrosion may be a subsidiary but not a fundamental cause of inter-crystalline fracture.

In view of the modern tendency to increase pressures and temperatures, the question is one of very considerable importance. Higher pressures imply not only higher temperatures, but thicker boiler plates and greater difficulty in fitting and consequently higher pressure in riveting. All of these factors tend to increase the liability to produce severe internal stresses in the material of the finished structure.

DISCUSSION

E. H. Saniter, Rotherham, considered that the temperature of working and the effects of corrosion might have been responsible for the inter-crystalline nature of the cracks.

C. H. Ridsdale, Middlesbrough, had found that inter-crystalline fractures usually occur in steel that has been rather over-annealed. Soft billets often crack when cold sheared, but in such cases the cracks invariably went straight through the mass of the crystals.

Dr. W. H. Hatfield, Sheffield, agreed with Mr. Saniter and said there was no evidence in the paper that temperature and corrosion were not responsible.

Harry Brearley, Sheffield, was gratified to notice that the downright dogmatic statement that fractures in steels always go across the crystals had been modified. Unannealed steel castings almost invariably break with fractures running around the crystals, and imperfectly annealed castings usually do this.

Dr. Stead said he had many years ago distinguished between the two types of fracture—through and around the crystal grains—and described an experiment showing how a sudden shock on steel having an intergranular fracture would cause that fracture to continue as an ordinary cleavage fracture.

Mr. Hanson, in reply, agreed with Mr. Saniter and Dr. Hatfield that temperature and corrosion had an effect. Corrosion, at any rate, must be regarded as only subsidiary, as stress is required to pull the crystals apart.

Dr. Rosenhain, also replying, drew attention to the misconception in Mr. Brearley's mind in regard to the alleged "downright dogmatic statement." The cases of inter-crystalline fracture quoted by Mr. Brearley were due to the presence of impurities round the crystal boundaries. The paper did not suggest, as Mr. Brearley seemed to suppose, that there was any departure from the usual rule that, under normal conditions, the fracture passes through the crystals.

Nickel-Iron Alloys

The paper on the "Constitution of the Nickel-Iron Alloys" by D. Hanson and Hilda E. Hanson, of the National Physical Laboratory, describes an investigation in which special attention has been given to the determination of the effects of small quantities of nickel on the critical points of pure iron and to an examination of Osmond's theory of the nickel-iron alloys and the determination, if possible, of the "stable" diagram of such alloys. The authors presented an equilibrium diagram for these alloys, which shows the transformation points obtained from thermal curves and conductivity experiments, and it indicates also the deviation of the transformation points from their probable equilibrium temperatures. While no high degree of accuracy is claimed for this diagram, it is probably not far from correct, and in any case the type of diagram appears to be definitely established.

DISCUSSION

Mrs. Hanson having introduced the paper, the president remarked that she was the first lady to read a paper in person before the institute.

Dr. F. C. Thompson, Sheffield, suggested that complete analyses of the materials used, especially the manganese content of the alloys, would be very useful to other workers.

J. N. Greenwood considered the paper most valuable to those industrially concerned with nickel steels for case-hardening and other purposes and indorsed Dr. Thompson's request for complete analyses.

Mr. Hanson, in reply, said that the authors realized that it was important to give the full compositions, but, working on small quantities, they did not want to use up the bulk of the melts in making complete analyses. Now that the work was done, they would try to obtain complete analyses of the more important alloys. As regards manganese, the alloys were practically free from this element.

Cleaning of Blast-Furnace Gas

A paper by A. Hutchinson and E. Bury Skinningrove dealt with "Rough Cleaning of Blast Furnace Gas at Skinningrove by the Lodge Electrostatic Process," which explained that it really represented the outcome of team work by the whole of the technical staff at Skinningrove.

The ultimate rough cleaning of blast furnace gas at Skinningrove for use in stoves, boilers, and other combustion processes has always been an essential consideration during the last ten years as making for fuel economy in the production of iron and steel. If a process could be found whereby the gas could be adequately cleaned for combustion processes (excepting, of course, the gas-driven power station) without loss of the sensible heat contained in the blast furnace gas, it was considered that a valuable fuel asset would be secured toward making the iron, steel, and by-product coking plant self-contained from the coal carbonized in the latter. The other palpable advantages to be derived from using cleaned gas are as follows:

1. Greater thermal efficiency at the stoves, boilers, and other furnaces where the cleaned gas would be utilized, by preventing heavy deposits in flues, checkers, and regenerators.
2. More profitable use of capital in obviating the laying off of plant for cleaning.
3. Reduction in labor employed for cleaning stoves, boilers, and checkers.
4. The preservation of the fire brick construction from attack by alkalies contained in the blast furnace dust.
5. The saving in gaseous fuel consumed at the aforementioned plant by the greater thermal effieciency of the blast furnace gas.

HEAT LOSS WITH WET CLEANING

In seeking these economies the main difficulty lay in the fact that existing rough cleaning processes did not economize the sensible heat in the blast furance gas which it was desired to preserve. In the case of water washing processes, not only was the sensible heat in the gas lost, but further fuel had to be expended in pumping the huge volumes of water required for the dust removal. In the case of filter cleaners employing filtering media of combustible textile fabric, the gas had likewise to be cooled to prevent damage to the filters and then reheated beyond its dew-point to prevent deposition of slime upon the filters, which would otherwise become choked. In both types fans had to be em-

ployed for forcing the gas through the plant, involving a further expenditure of power in fuel.

The full-size plant described by the authors has only recently been completed as a result of small-scale trials carried out early in 1917. In the design of the large scale plant, very little data existed as a guide beyond the vital importance of carefully regulated gas and electric flow and a maximum speed limit of gas flow of 3 feet per second. Furthermore, there was no standard degree of gas cleaning which could be fixed to guarantee clean stoves, boilers, and checkers.

VERY LOW DUST CONTENT NOT NECESSARY

In determining the size of cleaning plant to be employed, it was for obvious reasons desired to keep the capital expenditure within the limit required for rough cleaning, bearing in mind that the Theisen plant for the gas-driven power station at the works was already in existence and would always have to be employed to wash and cool the proportion of the gas required for that purpose. All that was necessary, therefore, was to clean the gas adequately for stoves, boilers, and other furnace work, and for these purposes 0.3 gramme of dust per cubic meter in the cleaned gas was ultimately fixed as an arbitrary standard.

Recent investigation at Continental works, where rough water washing for stove and boiler use is almost universally employed, has shown that the desired end can be obtained by a higher dust content in the cleaned gas, instances being on record where stoves had not been cleaned for five years, with a dust content of approximately 1.0 gramme per cubic meter in the water-washed gas. The arbitrary standard of 0.3 gramme per cubic meter was therefore well on the safe side, and there would be no point in increasing the capital expenditure on plant with the object of reducing the dust in the gas below that figure, so far as boilers, stoves, and furnaces were concerned. Since the start of the full-sized electrostatic plant at Skinningrove last Easter, the dust content has been reduced from 5 to 6 grammes per cubic meter in the raw gas to 0.8 to 1.1 gramme in the cleaned product, at which figure no deposit of dust has taken place in the flues since the plant started work. This result has been attained with 15 to 20 per cent of the electrostatic plant out of action, owing to difficulty in obtaining electrical equipment, spare transformers, etc. With the complete plant at work it is expected to maintain the dust in the cleaned gas at 0.5 to 0.7 gramme per cubic meter, which will serve amply the purpose for which the plant was erected.

GAS FLOW REQUIRES REGULATION

In the foregoing reference has been made to the vital necessity of carefully regulated gas flows as being essential to successful electrostatic treatment—a statement which demands great emphasis. It has to be remembered that in this method of gas cleaning the gas passes without restriction of any kind through nests of rods and plates, which are perfectly open and offer no resistance to the gas as in the case of filters or powerful sprays of water. The danger of gas slipping through the treatment chambers uncleaned is therefore much greater in electrostatic methods than is the case with water-spraying or filtration plant. Recognizing this difficulty, the electrostatic plant at Skinningrove was designed to split up the gas make and flow through sixteen cleaning units, further subdividing the flow in each chamber through adjustable bafflers, so that the gas would flow evenly over the discharge grids both in horizontal and vertical planes. As a further precaution the inlet of each chamber was designed so as to deliver the gas equally over the vertical and horizontal planes of the discharge surfaces, a similar arrangement being adopted at the chamber outlet in collecting the gas for delivery into the clean gas main. It was elected to regulate the flow of gas through each chamber by adjusting the outlet valve which, being clean, would not clog up and upset the gas flows.

Of equal importance is the equalization of the electrostatic field throughout the chambers, since any short circuiting would militate against equal treatment of the gaseous atmosphere. The Lodge Fume Co., which is responsible for the electrical equipment of the plant, has provided against this eventuality by supplying each chamber with two sets of discharge grids in series, each with its own transformer set. Each set of grids is provided with 7000 discharge points, that is 14,000 points to each chamber, so the electrostatic field is as evenly distributed throughout the chambers as conceivable. Short circuiting has taken place from time to time, but has invariably been the result of irregular cleaning of the grids. Such difficulties will disappear as the practice becomes standardized.

The authors regard the above considerations as of utmost importance in the successful application of electrostatic methods to cleaning blast furnace or any other gas.

The electrostatic installation had to be laid out with regard to the fact that a new and unknown factor was

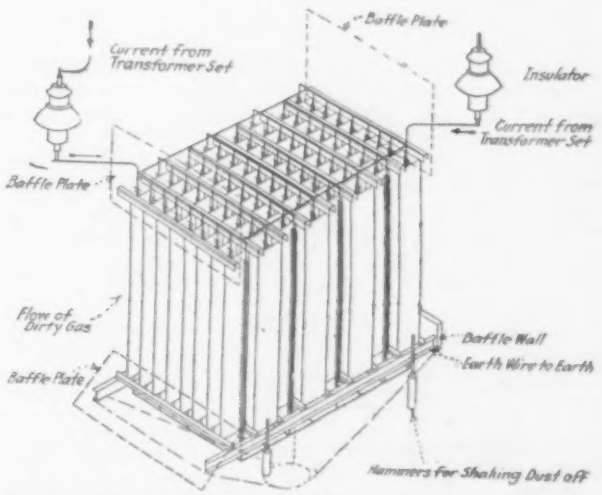


Fig. 1.—Lodge Plant for Electrostatic Cleaning of Furnace Gas. One-half electrostatic chamber showing 8 rows of plates

being introduced into the gas system upon which the whole of the works (blast furnaces, steel works, coke ovens, and power house) was dependent. It was decided therefore to attach this plant to a by-pass flue in order that it might be possible to revert to the old dirty gas supply in the event of trouble, pending the standardization of the new practice. It has only been necessary to by-pass the electrostatic plant on one occasion; that was when making improvements to the dust removal gear. Nevertheless it is strongly recommended that the electrostatic system should be placed on a by-pass flue, especially where all sections of the works are interdependent, as at Skinningrove. To make this policy complete, flues and pipe connections have been built so that stoves, boilers, and power gas-washing plant can be supplied instantly either with electrostatically cleaned gas or dirty gas.

A detailed account of the layout of the electrostatic plant is given in the paper together with data on the extraction of potash from the deposited flue dust. Fig. 1 shows half of one of the electrostatic chambers, while Fig. 2 is a sectional elevation of the plant.

The plant has only been at work since April 8 last—that is, approximately four months—and the authors could have wished for a greater period of time before communicating their results, as the plant has not had time finally to be tuned up. However, in view of the present keen interest displayed in gas cleaning, they submit their results so far as they have been obtained, with the promise of adding their further experience when acquired.

RESULTS IN CLEAN GAS AND IN POTASH RECOVERY

In the meantime they are content to have so far proved the following points with regard to electrostatic rough gas cleaning at Skinningrove:

1. That with 80 to 85 per cent of the electrostatic plant at work (remainder awaiting electrical equipment), the dust in the gas has been reduced from 5 to 6 grammes per cubic meter in the dirty gas to 0.8 to 1.1 gramme in the cleaned gas; or, in other words, to the standard of Continental practice for stove and boiler use.
2. That the above result has been attained with a total fuel consumption corresponding with 50 kw. only.
3. That no power is necessary for pumping water or for moving gas through the system.
4. That the cleaning has been effected with a compara-

tively small loss of the original sensible heat. The raw gas enters the cleaning chambers at 220 to 250 deg. C. and the cleaned gas leaves at 200 to 220 deg. C.

5. Less gas is being used at the stoves and boilers, but it is too early as yet to state the total saving accurately. All that can be stated is that the surplus gas available has increased; the exact economy can only be determined when all stoves, etc., have been cleaned and the clean gas given a fresh start.

6. The recovery of 48 to 50 tons dust per week containing 27 per cent KCl.

DISCUSSION

Prof. Henry Louis, Newcastle-on-Tyne, said he would like to have seen in the paper some account of the Cottrell process for comparison, and would like to know what were the points of difference. Was the author's figure of 50 k.w. for fuel consumption a total figure for all the power used on the plant, and to what quantity of gas did it apply?

A. K. Reese, Penarth, referred to the necessity for constantly regulating the flow of gas to prevent uncleaned gas passing through the system. This introduced an undesirable element.

He thought a gas cleaning plant should be entirely automatic in operation, as in the Brassert wet system and others.

H. M. Ridge, London, asked if it were possible to

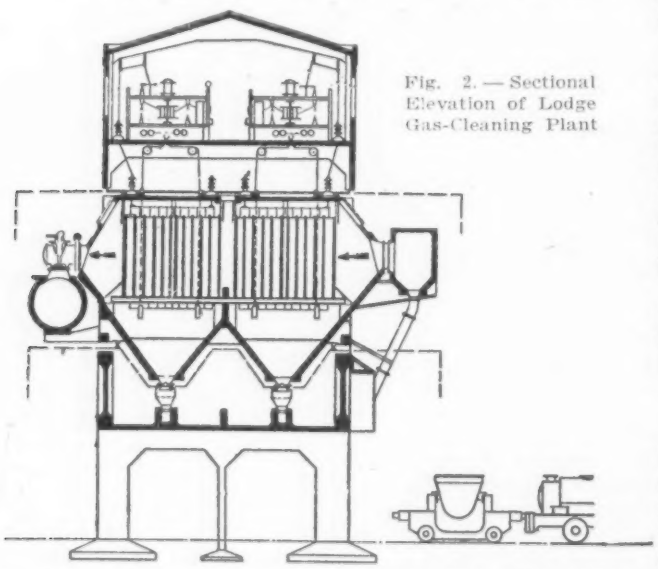


Fig. 2.—Sectional Elevation of Lodge Gas-Cleaning Plant

reduce the dust content of the cleaned gas still further. In any gas-cleaning system important points to be considered were capital outlay and working cost. The Halberg-Beth system involved enormous first cost in the consrtuction of the towers and coolers.

W. W. Hollings, Wrexham, said the figures for the reduction of the dust seemed very satisfactory. All blast furnace men knew that a great deal of waste occurred with the wet processes. He had had excellent results with dust catchers of the ordinary type, provided they effected a great reduction in the velocity of the gases. In such cases the dust catcher was quite an efficient rough cleaner.

Dr. Rosenhain asked if the Cottrell process was not merely an adaptation of that originally devised by Lodge.

F. W. Harbord, London, asked what was the capital cost of the plant, as this was a factor which would largely affect the competition between the various types of gas cleaners now on the market, such as the Kling-Weidlein, Brassert, Halberg-Beth, and the electrostatic systems.

LODGE AND COTTRELL PROCESSES

Mr. Hutchinson, in reply, said that the Lodge and Cottrell processes were essentially the same, but differed in a number of details, some of which he enumerated. He had selected the Lodge after careful investigation of both systems. The plant at Skinningrove had a total power consumption of 50 k.w. for all the gas from four blast furnaces, making 3000 to 3500 tons of pig iron per week. As regards regulation of the gas, this was effected by valves on the clean gas side, which were very easily regulated and set and required but little attention. As regards further cleaning, he would point out that the plant was installed for rough cleaning only and not for gas engines. For the latter purpose the gas was further cleaned in Theisen washers. It was difficult to give a really fair figure for capital cost under existing conditions as so much depended on the circumstances of individual plants.

Heat Variations in the Blast Furnace and Fuel Consumption

W. W. Hollings, in a paper on the above subject, observed that when Mr. Gayley first published his results from the use of dry blast in the autumn of 1904, in common with many others the Brymbo Steel Co. was much attracted by the seeming possibility of a considerable reduction in fuel consumption. Determinations taken over an extended period had shown that the moisture in the atmosphere at Brymbo ran on an average just over 3 grains per cubic foot, and no difficulty was anticipated in being able to reduce this to the region of 1 grain. If Mr. Gayley was able to obtain a saving of practically 20 per cent in his fuel consumption by reducing the moisture in his blast from 5.66 grains to 1.75 grain per cubic foot, or by 3.9 grains per cubic foot, it was assumed that an economy of not less than 10 per cent should be attainable by a reduction of 2 grains per cubic foot.

The matter was temporarily left in abeyance, but as time went on and confirmatory reports were received from various sources it was decided, in 1909, to proceed with the erection of a plant for drying the air. The method adopted finally was that of freezing out the moisture by means of the ammonia absorption process. From the moment of starting up the plant was all that could be desired for economical and efficient working; in fact, the cost of operating came out lower than had been figured on.

Unfortunately, the practical results obtained from its application fell very far short of the economy hoped for, the actual saving being only 3.34 per cent in place of the 10 per cent anticipated.

DRY BLAST DOES NOT PAY IN ENGLAND

In view of the brilliant results obtained by Mr. Gayley, this wide difference appeared to call for some explanation, and the search for such an explanation resulted in the construction of the theory which is advanced in this paper. The author's theory cannot be adequately conveyed in the space available, but the conclusions at which he arrives are:

1. That a relationship exists in the blast furnace between heat added to and heat developed and absorbed within the furnace, whereby the ultimate calorific effect of a variation in the heat supplied is in geometric ratio to the amount of the initial change; and consequently,

2. That for countries with such a low average absolute moisture as England, it does not pay to install the dry blast.

3. That the crushing of the materials of the charge to a uniform size may be expected to result in a considerable economy of the fuel required per ton of pig iron.

4. That the process of blowing with oxygen-enriched air is not likely to result in any appreciable saving for a small percentage increase in the oxygen.

DISCUSSION

A. K. Reese remarked that, as the only user of dry blast in the country (at the Dowlais Works) he supposed it was necessary to defend his position. In matters of this kind he found that practical results were obtained which were often better than those indicated by theory and, in fact, nearly all theoretical calculations never worked out in practice. He had no figures with him, but could certainly say that dry blast had been a success. This was shown by the burden carried by the fuel, which he thought was the best test of economy. Speaking in practical language, the burden before the introduction of dry blast was 18 cwt. per barrow of fuel, while after it was 20 cwt., in each case over a long period of operation under the same conditions. This certainly showed an improved fuel consumption due to dry blast. They also found that they could get higher temperatures of 1400-1500 deg. Fahr. without hanging or slipping. Further, they found that

with dry blast, variations in the composition of the iron (due to such causes as water entering the furnace from a cracked tuyere) came within much closer limits than with natural air. He thought the results obtained were due more to the uniformity than the actual reduction of moisture in the blast.

OXYGEN ENRICHMENT FAVORED

Professor Louis completely disagreed with Mr. Reese's views on theory and practice. Given absolutely correct facts and a sound theory, practice was bound to be in accordance with the theory. In the present case the author's theory was apparently based on the hypothesis that all the carbon was oxidized to carbon-dioxide. This, however, was not a fact. He differed also from the author's opinion on the possible value of oxygen-enriched air.

F. W. Harbord supported Professor Louis on the alleged antagonism between theory and practice and pointed out that in blast furnace work we had not a sufficient number of accurately ascertained facts on which to base a sound theory. As far as possible, however, he thought that blast furnace men should have at any rate some working hypothesis and not depend entirely on purely empirical methods. As regards the author's theory, he thought this had not been thoroughly established, and he also joined Professor Louis in demurring at the author's remarks on the use of oxygen.

Mr. Reese rose again to explain that his remarks on theory had not clearly expressed his position. He was not an opponent of theory and fully recognized that all practice was ultimately based on theory, but in blast furnace work the teachings of experience, arrived at in a practical way by trial and error, were still generally speaking more valuable than deductions arrived at on purely theoretical grounds.

DRY BLAST EXPENSIVE

W. J. Foster, Kenilworth, thought it was a great mistake to talk about theory and practice in blast furnace work. What is wanted is to arrive at the truth as to what actually took place. He thought the dry blast process, as introduced up to the present, was an expensive luxury, and advocated a system of superheated blast, or possibly the introduction of additional heat in the hearth of the furnace by electrical means.

ABANDONED DRY BLAST

J. S. Hollings, Wrexham, said he was responsible for the practical operation of the Brymbo plant and pointed out that every technical problem had three aspects, viz.: theoretical, practical and financial. At Brymbo they were in an ideal position for carrying out tests, as theirs was a one-furnace plant. They ran three tests of six months each, and on many of the points mentioned by Mr. Reese they got exactly the reverse results. They abandoned the dry blast system and other works had done the same.

W. W. Hollings, in the course of his reply, pointed out that he did not condemn the oxygen-enrichment process, but had observed that a small increase of the oxygen in the blast was not likely to prove of any benefit.

Electric Steels

C. G. Carlisle, Sheffield, gave in detail in his paper a large number of analyses and tests on electric steels made during the war in the electric furnace of J. Beardshaw & Sons, Ltd., Sheffield, and offered some opinions on electric furnace practice in general. Some of his remarks are given below:

There has been a surfeit of talk about production as a cure-all; no better illustration of the wrong interpretation of this magic word could be found than the farcical method of running the electric furnace by the clock and specifying beforehand the length of time that must be taken per heat. The most amusing experience was of the worker who set himself to get a heat out of a 3-ton furnace in four and a quarter hours, and became greatly excited if four and a half hours were taken, sometimes managing to get it out as the clock struck the quarter, to be rewarded, in consequence, with spongy ingots. In this connection the author cannot refrain from laying much blame on the patentees, in their zeal for business, for stressing this point of time, nor excuse the gullibility of the buyer for thinking that he had bought an automatic machine for making steel. The engineer's specification that in effect says that "no electric steel need tender," is not an indictment of electric steel in itself, but of those plant owners who have shown a lack of appreciation of the factors referred to above as necessary for success.

The history of steel-making during the last 30 years could be written in terms of a struggle to keep sulphur and phosphorus down. The acid Siemens process was a distinct advance on the Bessemer, and the basic processes made a still further step; but the electric basic-lined furnace has made it possible to obtain steel containing 0.02 per cent sulphur, and sometimes, as in the case of some of the alloy steels, 0.01 per cent or thereabouts.

Size of furnace evidently has an important effect on the elimination of sulphur. This is due mainly to the fact that the oxidizing slag can be raked off with greater minuteness in the small size of furnace, but it is also due to a larger slag area in proportion to weight of bath.

Phosphorus cannot be reduced in like degree, due to some extent to the greater care needed in adding ore, as the cutting action on the banks is slightly greater owing to the greater length of slag line per unit weight of metal.

Slag Conditions Most Important

It is for the most part the ability and art of the furnaceman in controlling his slags so as to obtain liquidity and correct thickness over the whole area of the bath throughout the charge, and more especially during the refining period, that determines whether sound metal is produced or not. In no other steel process does the slag play such a fatal part, or call for such wariness from the furnaceman. Five or ten minutes' neglect of the slag, and the metal often will be converted from sound to unsound material, as it becomes uncovered owing to the slag losing fusibility.

From costs got out some time ago, when conditions were much steadier than in these days, the author formed the opinion that a 15-20 ton electric furnace would produce as cheaply as a 50-ton acid Siemens furnace. The question of cost must never, however, be allowed to take first position in the steel-maker's mind. There is no compromising in steel-making—a good heat, even though it may have cost 5 or 10 per cent or even more over the second best, will have proved the cheaper by the time the steel reaches bar form. Too many technologists are engaged in investing complaints of bad steel: they would be better engaged in making good steel.

Nothing has been said about the adaptability of the electric furnace for making alloys which approach steel for strength but have some other distinct property, such as electrical resistivity or non-corrodibility, etc., but these offer no difficulty which the furnacemen cannot solve, and are very often simpler to deal with than steel.

It is certainly not advisable to apply crucible methods and recipes when making any mixture of the high melting point metals; no amount of killing agents—silicon, manganese, aluminum, magnesium, titanium—can take the place of a reducing slag under control.

With a correct slag, killing agents are not necessary. Steel can be made sound in the electric furnace, heat after heat, no aluminum whatever being required, while an incorrect slag and its consequences cannot be remedied by adding aluminum to the ladles. This is a distinction peculiar to the electric furnace.

For making steel castings this process has been tried for some considerable time with results which have more than satisfied the foundrymen. The possibilities of the electric furnace are by no means fully explored, but it has been clearly shown in the paper that it is a very flexible tool. The type of men available to obtain the best from it constitutes the real problem.

DISCUSSION

E. H. Saniter said this was the first paper on electric furnaces read before the institute by a manufacturer. Almost as low figures for sulphur and phosphorus could be obtained in the basic open hearth.

Dr. Andrew McCance, Glasgow, was of the opinion that the quality of electric steel depended entirely on the man in control of the operation. In the early days electric furnaces had been put in charge of electrical engineers, who were expected to make steel in them. The results had led to a prejudice against electric steel. From his own experience he could say that steel properly made in the electric furnace was fully equal in quality to the best of that made by other processes.

Dr. Andrew McWilliam, Sheffield, strongly queried the author's statement that with a correct slag killing agents were not necessary in the electric furnace.

Mr. Carlisle replied briefly to some of the points raised. As regards sulphur and phosphorus he quite agreed that equally good results could be obtained in the basic open hearth, but it took a far longer time.

SEPTEMBER PIG IRON

Daily Rate 2800 Tons More Than in August

Net Gain of 8 Furnaces—Manganese-Iron Alloy Output the Year's Record

The continued improvement in transportation is again reflected in the September production of pig iron. The total, while not quite equal to that for August exceeds any 30-day month thus far this year and ranks third, the output for March and August having been larger. In daily rate of production the month was only exceeded this year by March.

The production of coke and anthracite blast furnaces in September, a 30-day month, amounted to 3,129,323 gross tons or an average of 104,310 tons per day as compared with 3,147,402 tons or an average of 101,529 tons per day in August, a 31-day month and with 3,067,043 tons or 98,937 tons per day in July, a 31-day month. The September production is only 18,079 tons less than that of August and 246,574 tons less than March, the record thus far this year. There was a net gain of eight furnaces, the total in blast on Oct. 1 having been 319 as compared with 311 on Sept. 1. There were 18 furnaces blown in and five blown out or banked.

Another record for the year was made in the production of manganese alloys, the September total having been 39,546 tons. Of this total 27,686 tons was ferromanganese and 11,860 tons was spiegeleisen.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from September, 1919, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
September, 1919	60,954	21,978	82,932
October	41,796	18,319	60,115
November	57,589	22,156	79,745
December	61,815	23,129	84,944
January, 1920	72,015	25,249	97,264
February	75,230	27,490	102,720
March	80,021	28,879	108,900
April	65,168	26,159	91,327
May	68,668	27,644	96,312
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310

The figures for daily average production, beginning with January, 1914, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1914—Gross Tons

	1914	1915	1916	1917	1918	1919	1920
Jan.	60,808	51,659	102,746	101,643	77,799	106,525	97,264
Feb.	67,453	59,813	106,456	94,473	82,835	105,006	102,720
Mar.	75,738	66,575	107,667	104,882	103,648	99,685	108,900
Apr.	75,655	70,550	107,592	111,165	109,607	82,607	91,327
May	67,506	73,015	108,422	110,238	111,175	68,002	96,312
June	63,916	79,361	107,053	109,002	110,793	70,495	101,451
July	63,150	82,691	104,017	107,820	110,354	78,340	98,931
Aug.	64,363	89,666	103,346	104,772	109,341	88,496	101,529
Sept.	62,753	95,085	106,745	104,465	113,942	82,932	104,310
Oct.	57,361	100,822	113,189	106,550	112,482	60,115	.....
Nov.	50,611	101,244	110,394	106,859	111,802	79,745	.....
Dec.	48,896	103,333	102,537	92,997	110,762	84,944	.....

The furnaces blown in include one Crane furnace of the Empire Steel & Iron Co., in the Lehigh Valley; the Brooke furnace and one Worth furnace in the Schuylkill Valley, one Bethlehem furnace at Steelton and one Bethlehem furnace in the Lebanon Valley; No. 6 Duquesne furnace in the Pittsburgh district; the Colonial furnace and one Dunbar furnace in western Pennsylvania; the Allegheny furnace of the Allegheny Ore & Iron Co., in Virginia; one furnace of the Maryland Steel Co. in Maryland; one Bellaire furnace of the Carnegie Steel Co. in the Wheeling district; No. 1 Ohio furnace of the Carnegie Steel Co. and the Hanna furnace of the Republic Iron & Steel Co., in the Mahoning Valley; No. 2 South Chicago furnace of the Illinois Steel Co. and No. 10 Gary furnace in the Chicago district and No. 2 furnace of the Minnesota Steel Co., in Minnesota and the Cumberland and Standard furnaces in Tennessee.

Among the furnaces blown out or banked are one Bethlehem furnace of the Bethlehem Steel Co., in the Lehigh Valley, one furnace of the Cambria Steel Co. and the Perry furnace in western Pennsylvania; No. 4 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; the Marting furnace and one Wellston furnace in southern Ohio; one North Birmingham furnace; No. 2 Hattie Ensley furnace of the Sloss-Sheffield Iron & Steel Co. and the Sheffield furnace in Alabama and Napier furnace in Tennessee.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for September, and the three months preceding:

Pig Iron Production by Districts—Gross Tons

	Sept. (30 days)	Aug. (31 days)	July (31 days)	June (30 days)
New York	233,534	223,091	212,392	221,067
New Jersey	9,153	8,020	3,764	7,494
Lehigh Valley	100,309	96,310	87,622	80,680
Schuylkill Valley	89,498	83,143	76,614	82,232
Lower Susquehanna and Lebanon Valleys	80,862	67,849	57,863	63,810
Pittsburgh district	651,348	655,191	637,773	664,345
Shenango Valley	121,830	108,949	97,708	93,975
Western Penna.	156,155	183,125	177,866	165,907
Maryland, Virginia and Kentucky	110,097	102,785	99,850	103,219
Wheeling district	126,610	123,047	108,304	116,967
Mahoning Valley	281,785	304,482	297,462	267,816
Central and Northern Ohio	285,842	311,310	304,149	288,789
Southern Ohio	70,042	61,877	55,293	65,547
Chicago district	472,762	462,550	488,790	472,609
Mich., Minn., Mo., Wis., Colo., and Wash.	117,011	118,127	119,629	116,552
Alabama	197,532	212,946	218,227	209,087
Tennessee	24,953	24,600	23,737	23,444
Total	3,129,323	3,147,402	3,067,043	3,043,540

Capacities in Blast Oct. 1

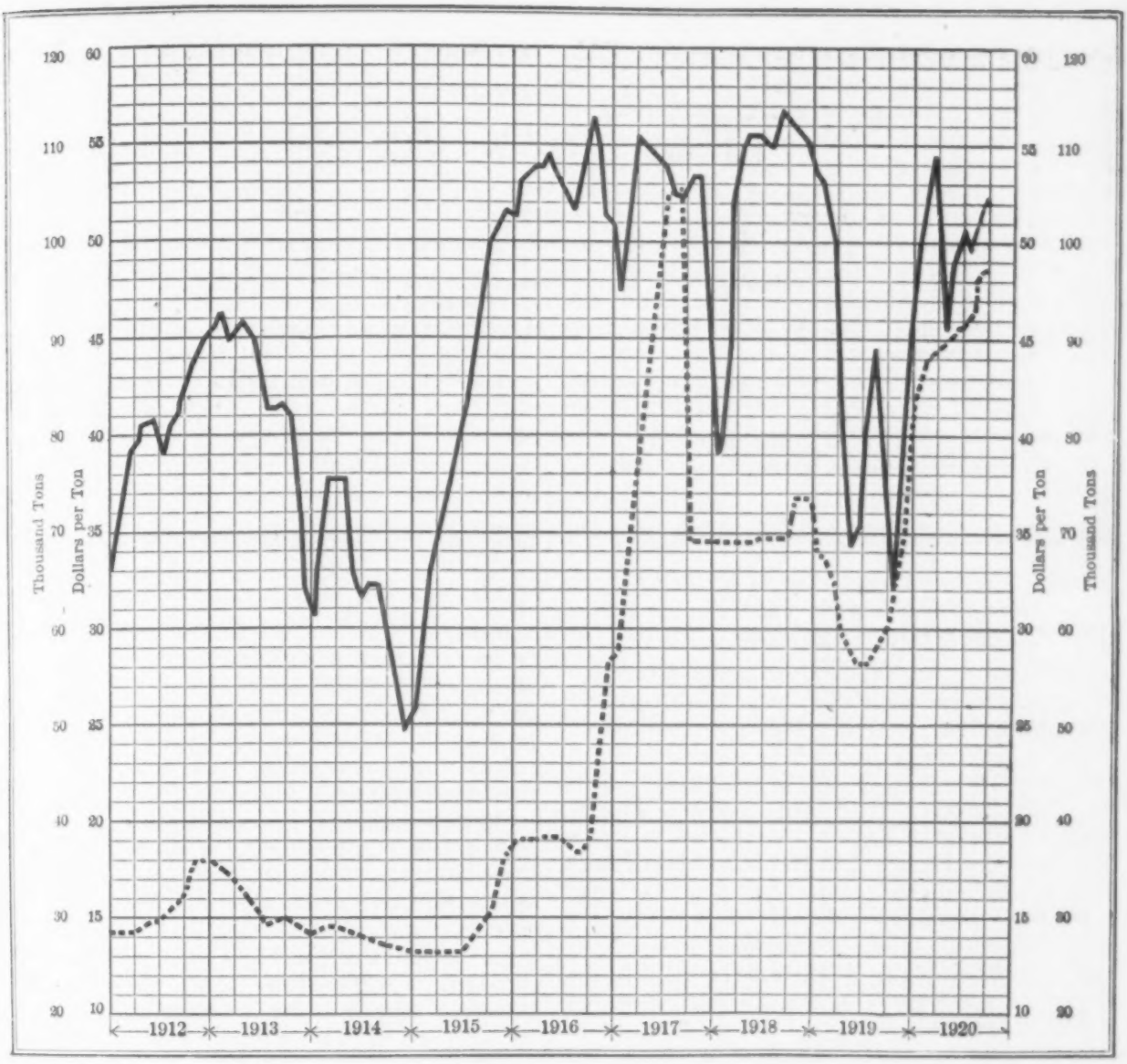
The following table shows the number of furnaces in blast Oct. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Sept. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces.	Total Stacks	Oct. 1 In Blast	Oct. 1 Capacity Per Day	Sept. 1 In Blast	Sept. 1 Capacity Per Day
New York:					
Buffalo	22	20	7,185	20	6,915
Other New York	4	3	600	3	600
New Jersey	4	2	305	2	250
Pennsylvania:					
Lehigh Valley	18	14	3,250	14	3,015
Spiegel	2	2	155	2	180
Schuylkill Valley	14	12	3,425	10	2,860
Lower Susquehanna	8	5	1,550	4	1,160
Ferro	2	2	135	2	110
Lebanon Valley	7	5	950	4	700
Ferro	3	3	210	3	180
Pittsburgh District	53	46	21,100	45	20,615
Ferro and Spiegel	5	3	565	3	520
Shenango Valley	19	12	4,060	12	3,950
Western Penn.	27	18	5,510	18	5,935
Ferro	1	1	55	1	65
Maryland	6	6	1,755	5	1,430
Wheeling District	15	12	4,440	11	4,075
Ohio:					
Mahoning Valley	27	23	9,700	22	9,820
Central and North.	26	23	9,825	23	10,280
Southern	16	12	1,900	14	2,245
Illinois and Indiana	40	32	16,470	30	16,000
Ferro	1	1	65	1	70
Mich., Wis. and Minn.	14	9	2,750	8	2,645
Col., Mo. and Wash.	8	4	1,215	4	1,165
The South:					
Virginia	17	9	1,135	8	1,035
Ferro	1	1	50	1	55
Kentucky	7	5	725	5	785
Alabama	45	25	6,345	28	6,815
Tennessee	17	9	760	8	790
Total	437	319	106,220	311	104,265

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1910 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2 X at Philadelphia. They are based on the weekly quotation of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920
Jan.	3,185,121	3,150,938	2,411,768	3,302,260	3,015,181
Feb.	3,087,212	2,645,247	2,319,299	2,940,168	2,978,879
Mar.	3,337,691	3,251,352	3,213,091	3,090,243	3,375,907
Apr.	3,227,768	3,334,960	3,288,211	2,478,218	2,739,797
May	3,361,073	3,417,340	3,446,412	2,108,056	2,985,682
June	3,211,588	3,270,055	3,323,791	2,114,863	3,043,540
July	3,224,513	3,342,438	3,420,988	2,428,541	3,067,043
Aug.	3,203,713	3,247,947	3,389,585	2,743,388	3,147,402
Sept.	3,202,366	3,133,954	3,418,270	2,487,965	3,129,323
9 mos.	29,041,045	28,794,231	28,231,415	23,693,702	27,482,754
Oct.	3,508,849	3,303,038	3,486,941	1,863,558	.....
Nov.	3,311,811	3,205,794	3,354,074	2,392,350	.....
Dec.	3,178,651	2,882,918	3,433,617	2,633,268	.....
Total	39,039,356	38,185,981	38,506,047	30,582,878	.....

*These totals do not include charcoal pig iron. The 1918 production of this iron was 347,224 tons.

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last,

Production of Steel Companies—Gross Tons

	Total production			Spiegeleisen and ferromanganese		
	1918	1919	1920	1918	1919	1920
Jan.	1,756,298	2,430,022	2,232,455	30,695	32,787	23,957
Feb.	1,620,254	2,209,470	2,181,679	26,114	28,105	28,038
Mar.	2,349,419	2,277,507	2,480,668	39,122	26,644	35,275
Apr.	2,411,488	1,838,677	1,968,542	35,511	17,308	27,628
May	2,513,577	1,586,805	2,128,720	54,633	14,604	33,407
June	2,407,166	1,655,944	2,209,770	44,844	14,254	34,751
July	2,456,693	1,906,604	2,230,567	51,762	14,805	36,789
Aug.	2,509,357	2,108,566	2,254,943	54,009	17,419	36,985
Sept.	2,507,381	1,828,613	2,247,250	66,275	20,631	39,546
Oct.	2,594,277	1,295,690	.....	70,379	20,238	.....
Nov.	2,501,867	1,727,656	.....	59,638	19,964	.....
Dec.	2,524,794	1,916,249	.....	49,435	15,718	.....

while stated separately, are also included in the columns of "total production."

Railroad Rate Hearing

The matter of alleged discrimination between Illinois intrastate rates and interstate rates applying to and from points in Illinois will come up for final hearing before the Interstate Commerce Commission at Chicago, on Oct. 6. The question to be determined is whether an increase in Illinois freight rates of 33 1-3 per cent creates undue discrimination in view of the increase of 40 per cent applied to rates from points east of the Indiana-Illinois State line to points in Illinois, and whether the increase of 20 per cent in interstate passenger fares without a similar increase in Illinois intrastate fares creates undue discrimination. Indiana put into effect intrastate freight rates, on Oct. 1, which conform with the increases authorized in Illinois.

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Prices and Mental Attitudes

The two favorite theories to account for high commodity prices have been inflation of currency and scarcity of material. The latest pronouncement is an interim report by a joint committee appointed some time ago by the chief labor unions of Great Britain. This committee now reports that the amount of money in circulation in Great Britain and elsewhere has increased greatly, and that this is the chief cause of high prices. The other theory, that of the scarcity of goods, has not been pushed of late, as information has been leaking out that goods as a whole have not been as scarce as the holders of the goods desired the public to believe.

The most important influence in human affairs, the manner in which the human mind operates, is given much less attention than it deserves, not so much because it is not understood as because quantitative expressions cannot be set down. Thus the amount of money in circulation is taken because there are precise figures as to the quantity of money now and before the war. Those who ascribe high prices to currency conditions are really thinking of the willingness of people to spend money, though they usually call it "ability." There is a difference, for sometimes men have money and do not spend it, while there are cases of men spending money that they do not have, as, for instance, when they buy automobiles on credit.

This matter of the mental state applies also to the "scarcity" theory to account for high prices of commodities. It is not the quantity of goods that is the factor, but the quantity that the buyer thinks exists. Eventually, of course, the goods must be discovered, but while their existence is concealed they do not affect the market.

Because mental conditions can change rapidly, markets sometimes change rapidly. A great change has been occurring of late in the United States. Men have lost the fear that prices would go still higher and instead are expecting prices to go lower. When either state of mind exists, the tendency is for the condition to be produced, or to be accentuated, upon which the mental conviction rests. If men believe a scarcity exists they usually buy and thus accentuate the scarcity, or produce one if none existed before. When they refrain from buying they cause the goods to become more plentiful.

Quite generally the mental state is a yes-or-no sort of thing. It does not draw fine distinctions or name its limits. When the buyer buys he does not say he will buy up to a certain price limit and then stop, and when he refrains from buying he does not set in advance a certain reduced price at which he will resume buying. Mental states, therefore, usually cause the market to swing too violently or too far, whether upward or downward.

What men expect and what they want are of course entirely different things, and there is likewise a difference between what the individual wants and what is best for the greatest number. "It is naught, it is naught, saith the buyer; but when he goeth his way, then he boasteth." The individual doubtless would like to see a return to pre-war prices in the things he buys, with a hope that the things he has to sell, whether commodities or personal service, may be overlooked. For the general good, however, no one can say that it is best that prices as a whole should recede to the pre-war level or to 50 per cent or 100 per cent above that level, or that they should advance to 250 per cent or 300 per cent above it. What is wanted beyond all is that there should be stability, that such a price level shall be established as will be in keeping with the actual conditions, including supplies of materials, the consuming requirements, the volume of currency and credit, the willingness of men to work and the willingness of capital to flow into investments.

In the long run the state of prices being in proper relation to physical, economic and financial conditions would be less sensitive to influences produced by mental states. There would then be not simply "confidence" but a well placed and justifiable confidence, for action resulting from

misplaced confidence simply invites a disastrous reckoning.

Gold Production and "Prosperity"

That very useful and aggressive publication, *Manufacturers Record*, now comes out with a plea that will hardly receive the general endorsement that is accorded to many of its utterances, for the plea is none other than that steps be taken to increase the world's production of gold for the purpose of avoiding "world-wide depression and poverty." It is held that expanding trade demands more gold, that prosperity has depended upon the quantity of gold mined, and that if this relation cannot be destroyed then the production of gold should be increased in order to preserve prosperity.

At the outset, there are those who will inquire as to the statistical basis of the premise that "decreasing gold output means, as it has always meant, far-reaching poverty." They will ask how it is that our great panic of 1857 was preceded by a year of record world gold output, $161,250,000, a record that was not broken until 1894, and how it was that our industrial depression lasted until 1899 when each of the years of depression beginning with 1894 saw a new record made in gold output.

Another question that may be asked is, why the world should consume energy in producing something that lies idle, when it is imperative that the whole industrial mechanism be efficient and apply its energies to the most useful things. The purpose served by the billions of dollars of idle gold is to support issues of paper money. Apart from other considerations, the enterprising thing to do would be to have only as much paper money as the gold available will take care of.

There is no use beating around the bush, however. The broad question is involved, whether or not it is well to deflate. The *Manufacturers Record* has consistently and certainly very vigorously opposed the deflation program of the Federal Reserve Board. Apparently it is now admitted that if we do not deflate we must have something new to base the world's currency and credits upon or must have much larger gold production.

The stimulus to industry that is given by an increasing quantity of money operates through the minds of men by creating the belief that costs are going to be higher and that new enterprises should be undertaken quickly to avoid prospective increases in the cost of doing the work. It is impossible to believe that the great majority of the people in the United States are not heartily sick of the thought of costs and prices increasing. One cannot conceive of many men being willing to do anything that would speed the advent of a new era of that sort of thing.

Whatever the theory may be, the bald fact is that throughout the history of industry periods of great activity alternate with periods of depression. Cause and effect are interwoven, the one producing the other. In time of activity men regret that they did not do more in the preceding depression, that they did not build more factories, power plants and buildings. In time of depression men regret that they did as much as they did. Unless one desires that the pendulum should thus swing to its extremes he should espouse all measures that tend to lessen the violence of these swings, in either direction, and should disapprove of anything that tends to add to the momentum of the pendulum. To claim that at the present time the world's business needs an artificial stimulus is to claim that we are now in a period of depression. The condition really is that there is a vast amount of work waiting to be done, but men are afraid to undertake the work for fear it will cost too much. Deflation promises safety and encouragement. Inflation promises the eventual visitation of a period of depression.

Stainless and Other Alloys

Striking results have been attained in recent months in combining certain metals in steels as special alloys, particularly in the field of non-corrosive alloys and stainless steels. The announcement only a few years ago of a stainless steel of unusual properties was but the beginning of a series of such steels. A further advance has been made in the development this year of a stainless steel of pronounced anti-corrosive properties, having also the property of flame-resistance to a high degree as well as unusual static strength at high temperatures. These latter qualities suggest its effective use in making vaults burglar proof.

In a different field a new alloy has appeared which at high temperatures is unaffected by oxygen or sudden cooling in water and which has distinct commercial value in certain heat-treating operations. In still another field there are the familiar acid-resisting iron castings which have been a distinct factor in commercial progress in the chemical industry.

In this significant metallurgical progress three metals play the important rôles—silicon, nickel and chromium. In the acid-resisting iron castings silicon confers the special qualities. It is also the basis of an important electrical steel. In certain special alloys, such as the one referred to, both nickel and chromium are the vital constituents. In stainless steel chromium alone bestows the unusual properties. Whether chromium or some other metal directly confers the striking properties of the new stainless steel is not definitely known, but there are strong reasons for thinking that it plays the leading rôle.

These new developments again call attention to the varied and important place of chromium in industry. They are also prophetic of further achievements, not only with chromium but with other familiar as well as rare metals in various combinations, aided by modern heat-treating processes.

Intermittent Patriotism

The closed shop is a thoroughly un-American institution, for a man who believes in and practices Americanism cannot say that he will not work with another man simply because that man does not belong to a labor union. Hence it would

not be surprising to hear a patriotic American in advocating the open shop say:

> We are living in the Republic of the United States of America, a country by no means perfect, in which all too frequently injustice is done. But it is a republic based upon the principles of freedom, justice and universal suffrage. Our men and women are not likely to throw these rights and principles into the scrap heap for the dictatorship of Moscow's Lenine and Trotzky. The harangues of the soviets in Russia will fall on deaf ears of the American organized labor movement.

But who would imagine that the above could come, as it has, from a statement promulgated by the chief advocate of the closed shop in the United States—Samuel Gompers, now and for many years president of the American Federation of Labor?

Mr. Gompers makes the above assertions in the document which he has issued, declaring that the American Federation of Labor has repudiated the British and International Labor parties and is "utterly opposed to anything that approaches any form of assistance to soviets." Mr. Gompers is making progress. Although he has not yet repudiated the closed shop, he is beginning to see the light. It is only a brief year since he was cheek by jowl with Foster, the syndicalist, and other radicals, and it is not a much longer time since he openly defied the Supreme Court of the United States, saying that he would not pay attention to its decisions if they were contrary to his convictions.

It is true that the harangues of the soviets in Russia will fall on deaf ears not only of American organized workingmen, but of American workingmen in general, for the masses of the working people are patriotic. Perhaps it is not too much to hope that these workingmen will see some things more clearly than their leaders, who most of the time influence them to walk in the ways of error, but now and then promulgate statements that sound patriotic.

Elections and Americanization

This is a peculiarly appropriate time to talk Americanism and Americanization in industrial plants, for soon employers and employees will go to the polls, each to register his choice for one or the other of the Presidential candidates and for the ideas his party expresses. It is a truism that a democracy can be successful only in so far as the popular thinking reaches a stage where decisions as expressed at the polls for the guidance of leaders are clear-cut.

Employees, therefore, who are privileged to vote and do not vote can be made to realize that they are lax in their duties as American citizens; they are, in truth, a hindrance to efficient democratic government, it can be pointed out, for if a majority of citizens neglected to vote, democracy and all the benefits pertaining to it would soon cease to exist.

As every one knows who has attempted to carry on an Americanization campaign within an industrial plant, it is hard at times to find something new to talk about. Hence, if the propaganda is linked with comment on the present election campaign, an opportunity for timely talks on numerous phases of American Government and the traditions of the United States can easily be made. The fact that a man can be a good citizen only if he performs the duties of a citizen, most important among which is voting, can be driven home in a variety of ways. Simple lectures and essays to the foreign-born employees on election procedure, connected, of course, in one way or another with the present party efforts, can also be made very effective.

At this time also many employees are embarrassed by repeated requests from opposing party representatives to talk to the men and women in the factory. These speakers, however, can be used to good advantage in the Americanization campaigns by having them rearrange their set speeches sufficiently to include something on our Government that will fit in appropriately with what has already been done. Thus, through these experienced speakers, a new and effective turn can be given to the factory's own campaign.

The Iron Age and Its Readers

The September issues of THE IRON AGE were notable in a number of respects. In the face of a corraling of technical contributions by two of the country's progressive societies, this journal was able to bring together a wealth of information in the lines to which these associations are devoted, the art of founding in the one case and the art and science of heat treating in the other.

The placing of blind workmen in gainful occupations will be helped very definitely by the authoritative account, Sept. 2, of the new operations successfully performed by the blind in Cleveland metal-working industries.

An authentic and practically the first description of any of the Gary plants of the Steel Corporation since 1909 appeared Sept. 16; besides the more than 50 per cent war time enlargement, the article covered the extensions made up to the period of the war, and also the work now in progress and contemplated.

Readers interested in non-ferrous foundry work were given in the issue of Sept. 30 the leading features of the British Institute of Metals meeting held only 14 days earlier.

Under the title "How to Become a Successful Shop Executive" the issue of Sept. 30 presented an unusually thoughtful study. While intended primarily for the foundry foreman, it was full of suggestions that might be applied with profit by any executive.

One of the very interesting statements made by Alexander Luchars in his report of conditions in Europe, of which an abstract was published in THE IRON AGE last week, is that the distribution of machine tools by the British Government did not apparently lessen purchases from the makers, but proved of use in reconstruction work and helped production at that time. This is only one of the important points touched upon in Mr. Luchars's valuable array of facts as to conditions in France, Germany, England and other European countries.

A total of 330 reading pages is a measure of the volume offered to readers in the month.

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Iron and Steel Markets

HESITATION CONTINUES

The Real Test of Prices Yet to Come

Pig Iron Market Is Weaker, While Production Is Slightly Increased

The falling off in buying of iron and steel is more pronounced and thus the week's developments in prices have been meager. The hesitation and uncertainty that have marked the motor car industry are now appearing in some degree in the agricultural implement trade, which only recently was said to be taking up enough steel to balance what automobile makers were cancelling. Some implement steel has been held up and tractor companies in particular have been halted by the Ford announcement.

All steel companies made much more steel than they booked in September and nearly all shipped more than they produced. Yet the leading independent makers have business that will carry them through the year and are not reducing prices, since that would mark down much that is on their books. The real test of the market is looked for at the turn of the year.

A verified sale of several thousand tons of plates for car work at 3c., Pittsburgh, has been widely discussed. The same buyer also closed for 8000 tons for Pere Marquette cars, paying in this case 2.65c., Pittsburgh, for plates, 2.45c. for shapes and 2.35c. for bars. In the Chicago district the Steel Corporation also sold 7500 tons to a car company at its regular prices.

Prices for rails for 1921 are not likely to be named by the Steel Corporation or the other makers until late December. Predictions as to the corporation's figure for open-hearth rails range from $52 to $55, as against $47 to-day.

Rail reservations in the East are put at 400,000 to 500,000 tons. For some time those in the Chicago district and further west have been estimated at 1,000,000 tons.

September pig iron statistics bear out the expectation of an increase. The output was 3,129,323 tons, or 104,310 tons a day, comparing with 3,147,402 tons in the 31 days of August, or 101,529 tons a day. The September rate was the highest since February, 1919, excepting March of this year.

October is likely to exceed September in production. Eighteen furnaces blew in in September and 10 went out, the estimated capacity of the 319 furnaces active on Oct. 1 was 106,220 tons a day, against 104,265 tons a day for 311 furnaces one month previous.

The fuel movement is by no means satisfactory and there is little promise of betterment. Sixty per cent of cars placed at western Pennsylvania coal mines are now being loaded for the Northwest. This keeps coke prices high and sets a limit to the pace and the extent of recession in pig iron.

Export shipments in September were substantially at the rate of August, when the total was 431,000 tons against 458,000 tons in July. The independent export company, with a September total of 112,000 tons, exceeded its average for this year by about 10 per cent.

The British Steel market appears to be stagnating. Steel companies there are laying off large numbers of men and Belgian competition is more pronounced. Semi-finished steel is $5 a ton lower, partly because of foreign competition, particularly in sheet bars.

The order for 15,000 tons of pipe for the oil line from Havre to Paris, 132 miles, has at last been placed with the United States Steel Corporation.

Another interesting item in the export trade is the sale of 10,000 tons of girder rails of the Lorain Steel Co. section to the Glasgow tramways. Other sales of such rails have been made in time past by the Steel Corporation to Birmingham, Manchester and Leeds on the preference given to this particular section rather than on unduly low prices.

Despite the fact that the price of prompt furnace coke has advanced 50c. per ton in the past week, owing to car shortage and the inefficiency of labor in the coke regions, the downward revision of pig iron prices has continued whenever the market has been tested. In harmony with the recent decline of $3 per ton on foundry iron in the Valley, basic has declined $2.50 to $46, with the report of a sale of 1000 tons for Eastern shipment at $47, while Pittsburgh interests are reported willing to sell at $45. That the market is not demoralized, however, is shown by the strength which has developed in some reselling and by the general acceptance of shipments, although there are some postponements and cancellations. The reduction of the price of Virginia iron by one company to $48, furnace, has not developed any business. In the Philadelphia market the principal sale of pig iron was 5000 tons of copper bearing low phosphorus at $57, the price which has recently been quoted.

The Lake Superior ore movement in September was 8,923,000 tons, or 350,000 tons less than in August. To Oct. 1 the total was 44,273,000 tons. Estimates for the season range from 53,000,000 to 55,000,000, as against 47,000,000 tons for 1919.

Pittsburgh

PITTSBURGH, Oct. 5.

The iron and steel situation is in a deadlock. Buyers are interested in the market almost exclusively to the extent of seeing how low a price producers will consider while most of the latter are adhering rather firmly to former price ideas. The result is that the actual amount of new business has not been so small since the early part of 1919, when, as is now the case, much uncertainty existed as to the course of prices. It is generally admitted by independent steel manufacturers that eventually the spread between their quotations and those of the Steel Corporation must be materially reduced before business can go forward again with the normal amount of confidence. The restoration of a single quotation upon the various products is being freely discussed, and there is much interest as to whether the Steel Corporation will advance its prices or the independents will make the full reduction. That there has as yet been no material cut in independent prices may be ascribed to the fact that practically all of them have bookings sufficient to keep them going over the remainder of the year, and it is believed

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 5, 1920	Sept. 28, 1920	Sept. 7, 1920	Oct. 7, 1919
No. 2 X, Philadelphia‡	$53.51	$53.51	$53.51	$31.10
No. 2 Valley furnace†	47.00	47.00	50.00	26.75
No. 2 Southern, Cin'ti†	46.50	46.50	46.50	31.60
No. 2, Birmingham, Ala†	42.00	42.00	42.00	28.00
No. 2, foundry, Chicago*	46.00	46.00	46.00	26.75
Basic, del'd, eastern Pa.	51.26	51.26	51.26	28.00
Basic, Valley furnace	*46.00*	48.50	48.50	25.75
Bessemer, Pittsburgh	50.46	50.46	50.46	29.35
Malleable, Chicago*	46.50	46.50	46.50	27.25
Malleable, Valley	50.00	50.00	50.00	27.25
Gray forge, Pittsburgh	*47.96*	50 96	50.96	27.15
L. S. charcoal, Chicago	58.50	58.50	58.50	32.75

Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	$55.00	$45.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	55.00	55.00	60.00	38.50
O.-h. billets, Pittsburgh	55.00	55 00	60.00	38.50
O.-h. sheet bars, P'gh.	65.00	65.00	68.00	42.00
Forging billets, base, P'gh.	70.00	70.00	75.00	51.00
O.-h. billets, Philadelphia	60.74	60.74	65.74	42.50
Wire rods, Pittsburgh	75.00	75.00	75.00	52.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.85	4.85	4.85	2.745
Iron bars, Pittsburgh	4.75	4.75	4.75	2.75
Iron bars, Chicago	3.75	3.75	3.75	2.62
Steel bars, Pittsburgh	3.25	3.25	3.25	2.35
Steel bars, New York	4.13	4.13	4.13	2.62
Tank plates, Pittsburgh	3.25	3.25	3.25	2.50
Tank plates, New York	3.63	3.63	3.63	2.77
Beams, etc., Pittsburgh	3.10	3.10	3.10	2.45
Beams, etc., New York	3.48	3.48	3 48	2.72
Skelp, grooved steel, P'gh.	3.25	3.25	3.25	2.45
Skelp, sheared steel, P'gh.	3.50	3.50	3.50	2.65
Steel hoops, Pittsburgh	5.50	5.50	5.50	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 5, 1920 Cents	Sept. 28, 1920 Cents	Sept. 7, 1920 Cents	Oct. 7 1919 Cents
Sheets, black, No. 28, P'gh.	*6.75*	7.00	7.50	4.35
Sheets, galv., No. 28, P'gh.	*8.25*	8.50	9.00	5.70
Sheets, blue, an'l'd, 9&10	*5.00*	5.25	6.00	3.55
Wire nails, Pittsburgh	4.25	4.25	4.25	3.25
Plain wire, Pittsburgh	3.75	3.75	3.75	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh.	$9.00	$9.00	$9.00	$7.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$37.00	$37.00	$38.00	$24.00
Carwheels, Philadelphia	43.00	43.00	42.00	24.50
Heavy steel scrap, P'gh.	*28.00*	28.50	29.50	19.00
Heavy steel scrap, Phila.	*23.00*	24.00	26 50	19.00
Heavy steel scrap, Ch'go.	*22.50*	23.00	26 00	18.50
No. 1 cast, Pittsburgh	*41.00*	42.00	42.00	23.50
No. 1 cast, Philadelphia	39 00	39.00	40.00	25.00
No. 1 cast, Ch'go (net ton)	*30.00*	32.00	35.00	23.50
No. 1 RR. wrot, Phila.	*31.00*	32 00	33.00	27.00
No. 1 RR. wrot, Ch'go (net)	*21.00*	22.50	24.50	19.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$17.00	$16.50	$17.00	$4.00
Furnace coke, future	14.00	14.00	14.00	4.75
Foundry coke, prompt	18.00	17.50	18.00	6.00
Foundry coke, future	14.00	14.00	14.00	5.75

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*18.25*	18.50	18.75	21.50
Electrolytic copper, N. Y.	*18.25*	18.50	18.75	21.25
Zinc, St. Louis	*7.50*	7.70	7.90	7.37½
Zinc, New York	*7.65*	7.70	7.90	7.72½
Lead, St. Louis	*7.50*	7.75	8.62½	5.95
Lead, New York	*7.50*	7.75	8.50	6.20
Tin, New York	*42.50*	43.50	45.00	55.25
Antimony (Asiatic), N. Y.	*7.00*	7.12½	7.00	8.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

that a reduction in prices now would only intensify the inclination of buyers to hold off.

Following closely on the heels of the $3 reaction in the price of Valley foundry iron to $47, for No. 2, comes one of $2.50 in the price of Valley basic iron, which in the past week has sold at $46 for immediate delivery to a Valley steel maker, the amount involved being 1000 tons. So little is going on in pig iron that the various grades are out of their normal alignment as to prices. The undertone of the market is weaker, and, as is true of the steel market, the situation is simmering down to a test between buyers and sellers. The fuel situation seems to be strengthening the hands of the producers of iron, for with furnace coke of none too good quality commanding $17, and in some cases more, any material recession in iron prices would wipe out profits and force a curtailment of production. Estimates of producing costs of some merchant interests, having some coke coming to them on contracts at well below the present spot basis run as high as $39 per ton, and those running to a large extent on spot coke claim that their costs are up around $44 and $45. These figures refer to foundry iron and hardly are applicable to either Bessemer or basic. The fuel situation is giving considerable concern to the entire iron and steel industry. Because of a shortage of coke, the Carnegie Steel Co., last Saturday, was obliged to bank nine of its furnaces, and while the blast has since been turned on, on several, it was producing iron from only 36 furnaces to-day, as compared with 41 a week ago. This condition largely was the result of the freight congestion on the Pennsylvania Railroad, which naturally affected the movement of coke over other lines tapping the Connellsville district. Apparently the Interstate Commerce Commission is determined that the Northwest shall have ample supplies of coal this winter, for 60 per cent of all of the cars placed at the mines now are being loaded with coal going to the lakes. This affects the supply available for other uses and keeps prices high.

Evidently the effect of the slump in the automobile industry upon the steel market has not yet been overcome entirely. An apparently authentic story is current here that Henry Ford recently called into conference several of the manufacturers with whom he has contracts and told them that the prices would have to be sharply cut if the contracts were to stand. Those lines of steel finding their principal use in the building of automobiles, if not actually lower in price, are more easy to obtain than they have been before in almost a year. The price of 4.25c. base on cold-finished steel bars, long regarded as a minimum, has in the past week become maximum, while former minimums on strips also now are on the top of the market.

Outside of the fact that the Pennsylvania Railroad, last Saturday, lifted the general embargo against east and west-bound freight through its principal gateways, the transportation situation has not changed greatly in a week. Shortage of open-top cars still is rather acute because of the failure of the Interstate Commerce Commission to accede to the request that cars with sides up to 42 in. be made available for general service. Box cars, however, are more plentiful and the movement of steel requiring that kind of equipment has been satisfactory. On the whole, railroad transportation conditions are not an important factor in steel works operation. It may be estimated that fully 80 per cent of the steel-making capacity of the Pittsburgh and adjacent districts is in operation, but the efficiency of labor remains extremely low and production of ingots is not greatly in excess of 60 per cent of the theoretical maximum.

Pig Iron.—Sale of 1000 tons of standard basic pig iron is reported to the Trumbull Steel Co. at $46, for immediate delivery, from a Valley furnace, and since the transaction is perfectly clean cut and not a resale, it establishes the basic market at $46, Valley furnace. No business of importance lately has been done in this market, where activities have been confined entirely to jockeying by both buyers and sellers, in an effort to arrive at mutually satisfactory prices. The Allegheny Steel Co., which recently put out an inquiry for 1000 tons of basic for prompt delivery, is reported to have been quoted a price the equivalent of $43.60 Valley furnace by a southern Ohio producer. It is interesting to note that at least two steel makers have tonnages of basic available which they will sell at $45 furnace. It is probable that if merchant producers of basic have any for sale during the remainder of the year, they will have competition from the steel makers who have surplus tonnages. Nothing has been done lately in Bessemer iron, but a price of $47.50 Valley furnace was named by one producer against a couple of small inquiries recently, and a steel casting company here, which recently bought 1000 tons of standard Bessemer at $47 Valley furnace, now finds that it is not going to require this iron and is trying to resell it. Some piecing-out demands for foundry iron are coming out from time to time, but as a rule melters of this grade are well covered and a large interest with foundries here and in Cleveland lately has been getting so much iron that it has ordered all shipments stopped. The Bessemer and basic pig iron averages from Valley furnaces, compiled by W. P. Snyder & Co., show a price of $48.50 for both grades. There were no sales of either grade and the prices merely are representative of the basis of the last previous sales.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$46.00
Bessemer	48.50
Gray forge	46.00
No. 2 foundry	47.00
No. 3 foundry	46.50
Malleable	50.00

Ferroalloys.—Trading remains extremely limited and the undertone of the market still is soft, with prices unchanged chiefly because of the lack of business upon which to base lower figures. Both English and domestic makers of ferromanganese still are quoting $170, seaboard, for 76 to 80 per cent material, but no business of any consequence lately has been reported at that figure, and the general belief is that firm offers of $5 a ton or more below this price would not go begging. Recent easing down in the price of spiegeleisen has not resulted in any increase in the demand. On the contrary, buyers appear to be holding off for further concessions. The American Manganese Mfg. Co. is quoting 18 to 22 per cent material at $80 f.o.b. furnace, Dunbar, Pa., and the New Jersey Zinc Co., $82.50 furnace, for 19 to 21 per cent alloy. The facts about the recent sale of some 8 per cent silvery iron to a Barberton, Ohio, melter are that the purchase amounted to 300 tons of resale iron for immediate shipment at slightly under the Jackson County furnace base. The market on ferrosilicon is nominal in the absence of business.

We quote 76 to 80 per cent domestic ferromanganese $160 to $175, delivered Pittsburgh, for either prompt or deferred shipment; English, $165 to $170, seaboard. We quote average 20 per cent spiegeleisen at $80, furnace and 50 per cent ferrosilicon at $75 to $80, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, $66; 10 per cent, $69.50; 11 per cent $72.80; 12 per cent, $76.10. Silvery iron, 6 per cent, $56.50; 7 per cent, $58; 8 per cent, $60; 9 per cent, $62; 10 per cent, $64.50; 11 per cent, $67.80; 12 per cent, $69.80. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets and Sheet Bars.—Not a great deal is going on in either product and prices are not particularly well defined. All of the independent companies regard $60, Pittsburgh or Youngstown, as a minimum price on newly made 4 x 4-in. standard analysis rerolling billets, and it is asserted that no basis in sales exists for a lower price, except on secondary or rejected steel. Recently a sale of 1500 tons of billets was made by a Pittsburgh producer at $50, but it is admitted that the steel was not of standard analysis. Considerable war steel still is being offered at low prices and billets rolled from the tops of ingots also are to be had at prices that are extremely low by comparison with the quotation on standard billets, although at very fancy prices compared with what such steel would bring if sold for scrap. Nominally the independent sheet bar market is quotable at $65 flat, but hardly enough is going on to definitely establish any price. It is reported that sheet bars have sold as low as $62.50 and while verification is lacking, it is not doubted that such a price might have been done on business between a maker anxious to move a round tonnage and a buyer who could take immediate delivery and make reasonably early payment. It is understood that the Newton Steel Co. inquiry for 5000 tons of sheet bars was closed at about $65, Youngstown. Some users of sheet bars supplied by the Carnegie Steel Co. on scale contracts will pay $47, Pittsburgh, for their fourth quarter allotments, as a result of the recent revision of prices in such contracts by that company.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $38.50 to $60; 2 x 2-in. billets, $42 to $63.50; Bessemer sheet bars, $42 to $65; open-hearth sheet bars, $42 to $65, and forging billets, ordinary carbons, $70 to $75 base, all f.o.b. Youngstown or Pittsburgh mill.

Wire Rods.—Not much has been going on lately, but such sales as are reported by independent makers have been at $75 for ordinary soft rods. Wire manufacturers who do not make their own rods are none too well supplied, but producers lately have been getting out more rods than they have capacity to finish. Rods running a little above the usual maximum in carbon, but which can be made into nails, have been offered at $70. Prices are given on page 953.

Plates.—Reports persist that business is being accepted by some of the independent companies as low as 3c. base, but makers here and those represented in this market are vehement in their denials that sales have taken place that low. The leading independent company here is quoting 3.50c. and claims to be declining business carrying a lower price. Others are quoting this price, but would not reject attractive tonnages at 3.25c. Several good-sized inquiries have been before makers lately, but they appear to have been made more for the purpose of testing the market than because those putting them out are in early need of supplies. An inquiry for 4000 tons recently was made by a car-building company, which closed for 2800 tons of shapes.

We quote sheared plates of tank quality, ¼ in. and heavier for early delivery from independent mills at 3.25c. Pittsburgh. The Carnegie Steel Co. still quotes 2.65c. and is accepting business at that figure, but is not guaranteeing early delivery.

Structural Material.—New structural lettings with fabricating interests in this district have been few and small in the past week, and until the credit situation improves materially it is not believed business will improve much. The more optimistic opinion is that the price readjustment will hardly be completed this year and easing down in the money market would not avail much if there were any lingering uncertainty as to steel prices. Better shipping conditions are permitting larger shop activities. The market for plain material is extremely dull, the only important business recently done involving 2800 tons of shapes to go to a car building company at 3.10c. base. It is reported that one of the fabricating companies in this district recently was able to place 400 tons of plates of rather undesirable specifications at 3c. Bars for structural purposes are not quotable at higher than 3.50c. and that price carries fairly prompt delivery. Independent quotations on shapes range from 3.10c. to 3.25c., the latter price covering the grey mill beams of the Bethlehem Steel Co.; on plates 3.25c. to 3.50c. and on bars 3.25c. to 4c. Prices are given on page 953.

Wire Products.—Demand for nails and wire continues strong and urgent, particularly for the former, all makers of which could take on large orders if they were in a position to do so. The trouble appears to be that all of them have back orders of considerable proportions and the common effort is to reduce or clean

up those obligations before accepting further commitments. The best that any of the makers will do is take orders from regular customers to the extent of completed orders, but most of them will not go even that far. Railroad transportation conditions have not been particularly satisfactory lately, for if cars have not been scarce, embargoes have interfered with the movement of finished materials from the mills. The American Steel & Wire Co. has not yet followed the independents in adopting a new card of extras on wire for size and for galvanizing in the finer gages. It develops, however, that this company has cut its discount on woven wire fencing from 60 per cent off list to 58 per cent off list for carload lots.

We quote wire nails at $3.25 base, as the price of the American Steel & Wire Co., and $4.25 to $4.50 by independent mills. We quote bright basic wire at $3.25, the price of the American Steel & Wire Co. and $3.75 to $4, the price range of the independent mills.

Tin Plate.—The market is quieter than it has been, due to the fact that good supplies of box cars have aided manufacturers to move accumulated stocks and thus meet the more pressing needs of consumers. The American Sheet & Tin Plate Co. has practically wiped out all of its accumulations of tin plate, and its total stocks of both sheets and tin plate now amount to only about 200 carloads. Independent makers are generally asking $9, per base box, for production tin plate, but not much business lately has been done. All companies will carry over much 1920 business into 1921, but the independents have less unfilled tonnage to-day than the leading interest.

We now quote tin plate to domestic consumers for remainder of the year delivery at $7 to $9 base box; stock items $9 to $10, and for export $11 to $12 per base box, all f.o.b. Pittsburgh.

Steel Rails.—Considerable interest still is apparent in the probable prices for standard rails for 1921 delivery. The U. S. Steel Corporation has announced that it would name prices on Jan. 1. Present independent company prices range from $55 to $75 for Bessemer sections, with the usual $2 per ton advance for open-hearth rails. One company claims that its August producing cost was around $55 and that in view of the increased freight rates, the effect of which was felt last month, the September cost cannot be much less than $60. This would indicate a price by this company of at least $65. The quotation of $75 for Bessemer rails refers to sales from stock rather than on production. Demand for light sections is less urgent and with buyers inclined to do some "shopping" before buying, 3.75c. base is not obtained as frequently or as readily as was the case a few weeks ago.

The Carnegie Steel Co. is still quoting the March 21, 1919, prices, these being 2.45c. for 25 to 45-lb. sections, 2.49½c. for 16-lb. and 20-lb. sections, 2.54c. for 12-lb. and 14-lb. sections, and 2.58½c. for 8-lb. and 10-lb. sections. This company is also quoting standard sections 50 lb. and heavier at $45 for Bessemer and $47 for open hearth stock. The Cambria Steel Co. is quoting 25-lb. to 45-lb. sections at 3.75c., 16-lb. and 20-lb. sections, 3.79½c., 12-lb., 3.84c., at mill, for such delivery as it can make. The Jones & Laughlin Steel Co. is quoting light rails at 3.25c. for 25 to 45-lb. sections.

Nuts, Bolts and Rivets.—Higher prices are being obtained for rivets by most makers, who note a strong demand from the railroads and railroad equipment companies and a fair amount of business from shipbuilders. Orders from the latter source are smaller than they were recently. Large structural rivets now are quoted at $4.75 base minimum and large boiler rivets at $4.85 minimum. No change is noted in bolts and nuts, most makers here still holding to the discounts and prices in effect prior to the advances named about the end of August. The prices and discounts quoted refer to prompt delivery business and only one or two makers here are taking such orders. Others are giving chief attention to cleaning up old orders and while progress has been made in this direction as a result of better deliveries of raw material, they still are declining new business and probably will have too little tonnage available for last quarter shipment to make a formal opening of books for that period. Prices and discounts are given on page 953.

Iron and Steel Pipe.—Although last month was the best in the matter of shipment that the National Tube Co. has experienced for some time, it was unable to make any material reduction in its accumulated stocks. Jobbers served by this company are all short of supplies and are exerting considerable pressure to secure shipments. The company has all of its plants in operation, but production is still below the theoretical normal. Independent makers are having a little more success than the leading interest from both production and shipping viewpoints. The only important change in the situation at large is that premiums over the regular mill bases, which were fairly common in oil country pipe a few weeks ago, have disappeared. All makers are sold well into 1921, but definite deliveries are not being made against new business. It develops that order No. 107, of the Interstate Commerce Commission, alloting 16 cars daily for the shipment of oil country tubular goods to the West and Southwest, which expired Sept. 21, was renewed until Oct. 11, and efforts are now in progress seeking extension beyond that date. Prices and discounts are given on page 953.

Boiler Tubes.—The independent market is extremely irregular and uneven with no two makers quoting exactly the same discounts. The Reading Iron Co. is not quoting at present, as its plant is down on account of labor troubles, while makers in this district have no specific discounts, but are naming prices in accordance with their ability to fill orders. Two Eastern makers are quoting sharp advances over bases at which business is passed in this district. The National Tube Co., of course, is holding to the discount on steel boiler tubes of March 21, 1919. Discounts are given on page 953.

Spikes.—Inquiries have fallen off again in the past week and makers have had word that some of the inquiries recently issued have been practically withdrawn for the time being. All makers are well sold up on both large and small spikes and recent prices are well maintained. No change is noted in track bolts of ⅝ in. or larger, but on the smaller sizes as high as 8c. and 10c. is being named by some makers. Prices are given on page 953.

Iron and Steel Bars.—The market shows no special change either as regards prices or demand. The Carnegie Steel Co. still is holding to the old basis of 2.35c., and is taking business from its regular customers for shipment at its convenience at that figure. It is stated that the present bookings of this company amount to more than a year's production. Independent manufacturers are not as far behind their orders as they were a few weeks ago, as a number of them have cancellations because of the slump in the automobile business, and the fact that prompt shipment demands have been less has enabled them to make some cut in old obligations. The leading independent is quoting 3.25c. base, but 3.50c is the minimum with most companies, and 4c. is still being asked by Cambria Steel Co. Makers of iron bars still are heavily committed and are firm in their price ideas, although there has been some falling off in the demand in the past few weeks.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 3.50c. at mill, prices depending entirely on the buyer and the delivery wanted. We quote reinforcing bars, when rolled from billets, at 3.75c. to 4c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.75c. and refined iron bars at 5c. to 5.50c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—Demand has flattened out further since last accounts and while most makers have a pretty good back log of orders, there is not the rush to specify against them that there was recently, and this has resulted in a little more pressure to sell. The result is seen in prices. While galvanized stock still is selling up to 8.75c. base, occasionally one Valley maker is reported to have quoted and accepted business at 8c. flat. One-pass box annealed black sheets are being offered by some makers for October deliveries as low

as 6.75c. Blue annealed sheets are quotable anywhere from 5c. to 6c., but as far as sales are concerned, a price higher than 5.50c. is little more than a quotation, and the report is current that 4.90c. has been named by one maker.

Cold-Finished Steel Bars.—Conditions are much more favorable to buyers than they were during the summer, and it is not only possible for buyers to place tonnages at 4.25c. base, but to receive prompt and specified delivery at that price.

Hoops and Bands.—The independent price still is 5.50c. base, but this figure now is not only maximum but extreme on new business. While some releases against suspended shipments are coming in from the automobile and allied interests, new demands are rather few and small and some makers already are said to be in a receptive mood on orders calling for early delivery.

Hot-Rolled and Cold-Rolled Strips.—Although cancellations and suspended shipments due to the slump in the automobile industry are said to have left makers with fairly full order books, it is observed that few of them are passing up chances for business and that some openly are seeking new orders. While hot-rolled strips are quoted at 5.50c. and cold-rolled strips at 8.50c. base, it must be said the market is steady, rather than strong at those figures.

Coke.—The spot market on bee-hive coke is at least 50c. per ton higher than it was a week ago, being quotable at $17 to $17.50 per net ton oven, for furnace grade and $18 to $18.50 and occasionally $19 for standard 72-hr. fuel. Car placements for several days have been bad in the Connellsville district, due chiefly to the fact that the Pennsylvania Railroad has been functioning only to a limited extent, and most of the cars placed have been through the Pittsburgh and Lake Erie railroad. The scarcity of cars, however, is only one factor in the considerable loss of production and shipment. It appears that liquor is plentiful in the region and since the workmen can now earn practically as much money in three or four days as they could in a week a year ago, a marked tendency toward idleness is noted. The labor situation is such that a well informed interest asserts that even if there was 100 per cent car supplies, they could not be loaded, nor could the plants be operated fully.

Old Material.—Although the report has been current that the Carnegie Steel Co. again has been considering the purchase of another big tonnage of scrap, some estimates running as high as 100,000 tons, the fact that the business has not appeared and that there has been much indifference upon the part of other consumers about purchases, has resulted in a further easing in prices of most of the steel works grades. It is a fairly common report from dealers that the steel companies are using the present unsettlement in the finished steel market as a means of forcing down scrap prices, and they are succeeding, for scrap dealers also appear to be a little alarmed over the prospects and are showing considerable anxiety about getting their contracts filled.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, deliv.	$28.00 to $28.50
No. 1 cast (for cupola)	40.00 to 41.00
Rerolling rails, Newark and Cambridge Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	39.00 to 40.00
Compressed sheet steel	23.00 to 23.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh, dist.	17.00 to 17.50
Railroad knuckles and couplers	29.50 to 30.00
Railroad coil and leaf springs	29.50 to 30.00
Railroad grate bars	29.50 to 30.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	33.00 to 34.00
Railroad malleable	34.00 to 35.00
Iron car axles	55.00 to 56.00
Locomotive axles, steel	46.00 to 47.00
Cast iron wheels	42.00 to 43.00
Steel car axles	42.00 to 43.00
Rolled steel wheels	29.50 to 30.00
Machine shop turnings	16.00 to 16.50
Sheet bar crop ends (at origin)	30.00 to 31.00
Heavy steel axle turnings	23.00 to 24.00
Short shoveling turnings	18.50 to 19.00
Heavy breakable cast	35.00 to 38.00
Stove plate	29.00 to 30.00
Cast iron borings	19.00 to 19.50
No. 1 railroad wrought	32.00 to 33.00

YOUNGSTOWN STILL BUSY

Schedules of Large Producers Not Affected—Premium Prices Disappear

YOUNGSTOWN, OHIO, Oct. 5.—Sharp declines in commodity prices have in nowise been reflected in the iron and steel market in this district, though there is a noticeable decrease in inquiry and a sharp sag in volume of new business. Schedules of major producers, however, have not been appreciably affected. Executives of two of the largest independents state cancellations have been much less than expected, while the cancellations of one maker of diversified product were less than 1000 tons in September, or about 1 per cent of the company's finishing capacity. This cancelled tonnage was replaced with new business at higher prices.

Premium prices have disappeared as the railroads have moved the large accumulated tonnage, and as automobile makers have curtailed production. Less than one-sixth, or about 60,000 tons of the peak overhang of stocked steel products, remains to be shipped in the Mahoning Valley. Heavy tonnages of sheets have been moved in the past 45 days, while pipe tonnages are going forward with uniform regularity due to extension until Oct. 10 of the special Interstate Commerce Commission order allocating 60 cars daily to makers in the Pittsburgh and Youngstown districts for such purpose.

Lower levels for pig iron and steel bars are expected; in fact, sheet bar quotations are down $5 and $10 and the market seems to have temporarily settled itself at $65. One large buyer of bars purchased for conversion into automobile sheets states that offers of bars have been made by outside interests at considerably lower levels than are quoted here, for fourth quarter delivery. With a dearth of inquiries the pig iron market is in an unsettled condition and there is no change in current quotations owing to lack of actual transactions. Recent sales of No. 2 foundry iron, 1.75 to 2.25 silicon, at $47, Valley furnace, have established a temporary market.

In the case of the larger makers, steel orders on hand will engage rolling capacity until the end of the year, principally from the regular channels, while business in prospect is expected to carry the mills well into spring. Some of the smaller makers, the variety of whose output is restricted, may not be in so fortunate a condition.

The Sheet Market

The same conditions prevail in the sheet market as in other products. Premium buying has wholly disappeared because of the improvement in shipping. Aside from the absence of premium prices, there is no evidence that Valley makers are contributing in any substantial way to the price reductions announced by a number of automobile builders. One interest is reported to have shaded prices in a way to benefit all consumers, but there has been little change in the general level of quotations. Demand for blue annealed is still light and the price range is from 4.75c. to 5.50c. Black sheets are quotable from 6.25c. to 6.50c. and galvanized at 8.50c. base. Several interests catering to the automobile industry have a number of hold-up orders on their books and are consequently in better position to make deliveries.

The pipe market is strong and mills continue to make shipments against contracts.

Blast Furnace Operations

With resumption of Mattie furnace at Girard of the A. M. Byers Co. on Sept. 29, after several weeks' suspension, there are only three idle stacks in the Valley, two of the Carnegie Steel Co. at the Ohio Works, and the Niles furnace of the same interest, which has been idle for an indefinite period. The Sheet & Tube company's plate mill resumed Monday after a week's idleness. Bessemer plant of the Republic Iron & Steel Co. started again Sunday evening after being idle several days for repairs. At the Brown-Bonnell works of the same interest two 10-in. bar mills and the 20-in. bar mill are idle this week.

Chicago

CHICAGO, Oct. 5.

The market is exceptionally quiet throughout and the volume of current business is too small to serve as a dependable gage of the trend of prices. It is possible that the appearance of attractive inquiries for either finished steel or pig iron would bring out substantial concessions in quotations, but no such tests of the market have developed. Even the resale material which is being offered is not being absorbed very rapidly. On the whole, independent quotations on finished steel remain nominally the same as heretofore and pig iron furnace prices are unchanged. Wire products and bolts and nuts are exceptional in that the demand for them is still in good volume. Mill and furnace operations in the district are about the same as a week ago. The Wisconsin Steel Co. is still operating on a reduced schedule because of insufficient fuel and the leading steel interest could put on additional blast furnaces if coal deliveries would permit. On the whole, production in this territory is close to normal, but few industries are succeeding in building up fuel reserves. In Indiana the new State food and coal commission is now functioning and proposes to fix prices on all non-contract coal mined in the State.

Pig Iron.—The market is in a stalemate. Little new inquiry has developed, and while numerous lots of resale material have appeared they have not been of sufficient aggregate tonnage to affect the position of the furnaces. In fact, several lots of resale iron have been sold at full market prices, and such concessions as have been made have been small. Some consumers are evidencing a desire to cancel contracts not yet delivered, but producers are a unit in refusing to grant the requests. Efforts to cancel, however, have not assumed such proportions as to indicate a serious curtailment in the foundry business. In fact, the lots of resale iron now being offered are not regarded as indicating an over supply so much as a desire to obtain liquid capital or to profit by the difference between present prices and anticipated reductions.

The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton.

Lake Superior charcoal, averaging sil. 1.50 (other grades subject to usual differentials), deliv. at Chicago....	$58.50
Northern coke, No. 1 sil. 2.25 to 2.75.	48.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25.....	46.00
Northern high phos.	46.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25.....$50.92 to	51.87
Southern coke, No. 2 foundry, sil. 2.25 to 2.75 ..... 49.92 to	50.37
Southern foundry, sil. 1.75 to 2.25....	48.67
Malleable not over 2.25 sil.....	46.50
Basic	46.00
Low phos. (copper free).....	60.00
Silvery, 7 per cent.....	63.32

Ferroalloys.—All of the ferroalloys are quiet.

We quote 75 to 80 per cent ferromanganese, delivered, $176.26 to $179.94; 50 per cent ferrosilicon at $85, delivered; spiegeleisen, 18 to 22 per cent, $82 to $85 furnace; 8 per cent silvery, $61.32.

Plates.—The market is generally quiet and in the absence of business the stability of the present quotations of independent mills has not been tested. So far as this territory is concerned, 3.25c., Pittsburgh, seems to be the minimum independent price on plates of tank quality. The leading interest continues to accept specifications at its old price. The St. Louis, Brownsville & Mexico is inquiring for 550 box cars, involving 3000 tons of plates, shapes and bars. The Los Angeles & Salt Lake is in the market for 18 passenger cars, requiring 350 tons of plates, shapes and bars and 40 tons of axles.

The mill quotation is 2.65c. to 3.50c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.75c. to 4.28c. for plates out of stock.

Structural Material.—Bids on the local Federal Reserve Bank, which will involve 8750 tons of steel, will be received this week, and it is believed that the fabricating award will be made in the near future. The Chicago & Northwestern has let 910 tons for reinforcing an ore dock at Ashland, Wis., to the American Bridge Co. The market in structural shapes is slow and no further change in independent mill quotations is reported.

The mill quotation is 2.45c. to 3.25c., Pittsburgh, which takes a freight rate of 38c. per 100 lb for Chicago delivery. Jobbers quote 3.58c. to 4.08c. for materials out of warehouse.

Sheets.—Having reduced their prices, some of the automobile companies are now in the market for sheets. One concern wants 3500 tons of No. 9 blue annealed for shipment before the close of the year, and another company is inquiring for 1500 tons of the same gage for similar delivery. The local independent has bookings which will probably employ its facilities until some time in February, but expects to open its books for the remainder of the first quarter within the next two or three weeks. Outside independent mills continue to shade their prices, the minimum on black being 6c., Pittsburgh, on blue annealed 5c., and on galvanized 8.25c. Some resale material has appeared on the market and has tended to encourage the softening tendency of independent prices.

Mill quotations are 4.35c. to 7.25c. for No. 28 black; 5.55c. to 6c. for No. 10 blue annealed, and 5.70c. to 8.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb. The lowest prices are those of March 21, 1919.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 7.13c.; No. 28 black, 8.10c.; No. 28 galvanized 9.60c.

Wire Products.—The steady improvement in the operating of the leading mills continues. Owing to a continuation of the heavy demand for its products, however, the foremost interest has not deviated from its policy of taking new business on a replacement basis. The local independent is well booked ahead. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 953.

Rails and Track Supplies.—Buying of track bolts and spikes for early delivery continues in lots averaging about 1000 kegs each. Purchases of tie plates, however, have fallen off. Railroads which have made tentative arrangements with the leading interest for their 1921 rail requirements are anxiously awaiting information as to prices and believe that Judge Gary's return from abroad will lead to an early announcement in this connection.

Standard Bessemer rails, $45 to $55; open hearth rails, $47 to $57. Light rails, $2.45c. to 3.50c., f.o.b. makers' mills.

Standard railroad spikes, 3.35c. to 4c., Pittsburgh. Track bolts with square nuts, 4.60c. to 5c., Pittsburgh. Steel tie plates, 3c. to 4c. and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c. to 4c.; f.o.b. makers' mills.

Bars.—Although the domestic market for mild steel bars is dull, there is a fair demand for small sections for export, on which 3.75c., Pittsburgh, is offered for delivery before the close of the year. There is no change in the local situation, both the leading interest and the foremost independent being committed until the end of the year and beyond. The latter will employ its Chicago Heights mill part time on soft steel bars in the hope that its overlap will be disposed of by the end of January. It expects to open its books for first quarter business within two or three weeks. Resale material is commencing to appear, but not in sufficient aggregate tonnage to affect the market materially. A forge shop which was a buyer a short time ago is now offering 500 tons of bars at 3.50c., f.o.b. plant, and a tractor company is trying to dispose of a few hundred tons at 3.25c. The situation in iron and rail carbon steel bars is unchanged.

Mill prices are: Mild steel bars, 2.35c. to 3.75c.; Pittsburgh taking a freight of 38c. per 100 lb; common bar iron 3.75c. to 4c., Chicago; rail carbon, 4c. mill.

Jobbers quote 3.48c. to 3.98c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.90c. for rounds and 6.40c. for flats and squares, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. for orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 4.63c. base.

Cast Iron Pipe.—The market is inactive and without features.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $88.10; 6-in. and above, $83.10; class A and gas pipe, $4 extra.

Bolts and Nuts.—Although some bolt and nut makers have received further cancellations, the business cancelled is not sufficiently large to change the relation between bookings and production. Most manufacturers are committed several months ahead and are experiencing difficulty in taking care of current inquiry. Several important Western makers continue to quote below the prices published under finished iron and steel, f.o.b. Pittsburgh, page 953, which include the latest advance.

Jobbers quote structural rivets, 5.08c. to 5.73c.; boiler rivets, 5.18c. to 5.83c.; machine bolts up to ¾ x 4 in., 20 per cent off; larger sizes, 10 off; carriage bolts up to ¾ x 6 in., 10 off; larger sizes 5 off; hot pressed nuts square tapped and hexagon tapped, list price plus $1.15; blank nuts, list price plus $1.15; coach or lag screws, gimlet points, square heads, 30 per cent off. Quantity extras are unchanged.

Railroad Rolling Stock.—The Clarkson Coal Mining Co., Cleveland, has bought 500 composite gondola cars from the Haskell & Barker Car Co. The St. Louis, Brownsville & Mexico is inquiring for 550 box cars and the Los Angeles & Salt Lake for 18 passenger cars. The Missouri, Kansas & Texas has postponed action on its inquiry for 3500 cars until November. The Wheeling & Lake Erie, which was in the market for 2000 gondola cars and 1000 box cars, has also decided to delay action for a time. The Illinois Central has ordered 25 switching locomotives from the Baldwin Locomotive Works. The Western Maryland has ordered 20 consolidation type engines, the Baltimore & Ohio 50 Mikado type, the International & Great Northern 10 Pacific and Mikado types and the South Manchurian Railway 12 engines, all from the same builder. The Manila Railway has bought 20 locomotives and the Shantung Railways three Pacific type engines from the American Locomotive Co. The Central of Georgia is in the market for six Mallet type engines, the Seaboard Air Line for six Mikado type, the Chicago, Terre Haute & South Eastern eight switchers, the Gulf Coast Lines six 10-wheel switchers, and the Pittsburgh & West Virginia for one consolidation type engine.

Old Material.—The market is exceptionally quiet, but such purchases as have been made by consumers indicate a further weakening of prices. Sales to users have been so limited, however, that the appended quotations are to be regarded as largely nominal. Among railroad offerings are the following: The Great Northern, 3800 tons; the Pennsylvania Southwest Ry. System, 500 tons of miscellaneous rails; the Union Pacific, 2000 tons, and the Baltimore & Ohio Chicago Terminal, 250 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$35.50 to	$36.00
Relaying rails	57.50 to	62.50
Car wheels	37.00 to	38.00
Steel rails, rerolling	34.50 to	35.00
Steel rails, less than 3 ft	24.50 to	25.00
Heavy melting steel	22.50 to	23.00
Frogs, switches and guards, cut apart	22.50 to	23.00
Shoveling steel	22.00 to	22.50
Low phos. heavy melting steel	27.00 to	27.50
Drop forge flashings	18.50 to	19.00
Per Net Ton		
Iron angles and splice bars	32.00 to	32.50
Steel angle bars	21.50 to	22.00
Iron arch bars and transoms	33.50 to	34.00
Iron car axles	40.00 to	41.00
Steel car axles	33.00 to	33.50
No. 1 busheling	18.00 to	18.50
No. 2 busheling	11.00 to	12.00
Cut forge	21.00 to	21.50
Pipes and flues	14.00 to	14.50
No. 1 railroad wrought	21.00 to	21.50
No. 2 railroad wrought	21.00 to	21.50
Steel knuckles and couplers	22.50 to	23.00
Coil springs	23.50 to	24.00
No. 1 cast	30.00 to	31.00
Boiler punchings	23.00 to	24.00
Locomotive tires, smooth	20.00 to	21.00
Machine shop turnings	9.00 to	9.50
Cast borings	11.50 to	12.00
Stove plate	26.00 to	27.00
Grate bars	24.00 to	24.50
Brake shoes	23.50 to	24.00
Railroad malleable	25.00 to	25.50
Agricultural malleable	24.00 to	24.50
Country mixed	15.50 to	16.50

Boston

BOSTON, Oct. 5.

Pig Iron.—Furnace pig iron prices, as quoted here, are unchanged, but purely nominal owing to a lack of buying. Going business is confined to spot car lots of Virginia, eastern Pennsylvania and Buffalo iron, which in some instances have sold at $1 to $2 under furnace prices. Foundries offering such iron have no more storage room, are receiving iron faster than they can pay for it, or are getting iron previously bought at prices considerably under to-day's market and are anxious to resell, believing the market is going lower. So many foundries, however, have all the iron they want it is difficult to resell except at a concession. The only sale of importance reported this week is one of 400 tons Pennsylvania malleable, first quarter delivery, at less than $54 delivered or less than $50 furnace, to a Rhode Island consumer. New England foundries, as a rule, are busy, but new business is coming in slowly, and pig iron is coming forward freely, which accounts for the present slack buying from furnace representatives. Delivered pig iron prices follow:

East. Pa., sil. 2.25 to 2.75	$55.31 to $59.06
East. Pa., sil. 1.75 to 2.25	54.06 to 57.06
Buffalo, sil. 2.25 to 2.75	54.71 to 56.71
Buffalo, sil. 1.75 to 2.25	53.46 to 55.46
Virginia, sil. 2.75 to 3.25	57.58 to 61.58
Virginia, sil. 2.25 to 2.75	55.83 to 59.83
Virginia, sil. 1.75 to 2.25	54.58 to 58.58
Alabama, sil. 2.75 to 3.25	51.91 to 55.67
Alabama, sil. 2.25 to 2.75	50.91 to 53.92
Alabama, sil. 1.75 to 2.25	49.66 to 52.67

Ferromanganese.—The demand for ferromanganese is quiet. The Union Steel Casting Co., Boston, resold a car to a local old material dealer at $137.50 a ton, and is offering a car of ferrosilicon at a price considerably below the market.

Coke.—The New England Coal & Coke Co. has reduced its price on 1920 foundry coke from $23.70 to $22.70 a ton delivered where the freight rate does not exceed $3.40. Its price on crushed coke is unchanged at $17 a ton f.o.b. ovens, Everett, Mass. That company and the Providence Gas Co., Providence, R. I., have opened their books for first half, 1921, foundry coke. The New England company, for next year, is quoting on a $15.50 Connellsville oven base, plus $6.20 freight, or $21.70 delivered New England points, with the same form of contract as exists to-day. That is, the company reserves the right to advance or reduce its price if the cost of coal, transportation, labor, etc., advances or declines. The Providence Gas Co. will accept 1921 business either at a flat or a sliding scale rate. Its flat rate is $24.75 a ton delivered where the freight rate does not exceed $2.50. The sliding scale price will be based on prices for spot foundry coke f.o.b. Connellsville ovens, as shown in the first issue each month of the Connellsville *Courier* The company guarantees a minimum charge of not less than $15.50, and a maximum charge of not more than $19.50 f.o.b. Connellsville. New England foundries so far have not been anxious to buy 1921 coke. Most of them are well supplied to-day and some are requesting that contract fuel deliveries be stopped temporarily.

Warehouse Business.—Going business in structural and plates is confined to small tonnages on which no change in prices is reported. Iron and steel are coming forward more freely from the mills, especially small sizes, but nobody is overstocked and prices apparently are very steady. Manufacturers have advanced expansion bolts and shields 20 per cent, but no change in jobbing prices has been made. The General Electric Co., West Lynn, Mass., is inquiring for about 100,000 nuts, various sizes. Local warehouse quotations on proof coil self colored chain have been marked up, and those on Leader horseshoe nails have advanced to a level with Crown.

Jobbers quote: Soft steel bars, $5.50 to $6.50 per 100 lb. base; flats, $6.50 to $6.85; concrete bars, $6 to $6.50; tire steel, $7 to $7.50; spring steel, open hearth, $11; crucible, $16; steel bands, $8 to $8.25; steel hoops, $9; toe calk steel, $8; cold-rolled steel, $10 to $10.50; structural, $6 to $6.50; plates, $6.50; No. 10 blue annealed sheets, $9; No. 28 black sheets, $9.15; No. 28 galvanized, $10.50; refined iron, $5.50 to $8; best refined, $7 to $7.50; Wayne, $8.50; band iron, $8; hoop iron, $9; Norway iron, $20.

Old Material.—Increased offerings of and a slump in the demand for old material have caused a general decline in prices since last reports. The market to-day is uncertain. No. 1 machinery cast is offered at $44 to $45, delivered, as against $50, the top price of the year, paid by a Rhode Island foundry a fortnight or so ago. There is little demand, however, and the market looks weaker. Stove plate is $1 to $2 lower on freer offerings and light buying. The American Steel & Wire Co., Worcester, Mass., and the Pittsburgh district mills are out of the steel market, but there is some buying for eastern Pennsylvania mill account at about $17 and $18. The eastern Pennsylvania mills, however, have stopped taking pipe. No. 1 railroad wrought is offered at $28, delivered in Pennsylvania, or $23 to $24, local yards, which represents a drop of about $3 in the market since last reports. Dealers have taken a few machine shop turnings, against contracts, at not

better than $13.50 f.o.b. local yards, but within the past day or two offerings have been made at 50c. to $1 less. Local yard prices on old material follow:

No. 1 heavy melting steel	$17.00 to $20.00
No. 1 railroad wrought	24.00 to 25.00
No. 1 yard wrought	20.00 to 21.00
Wrought pipe (1-in. in diam., over 2 ft. long)	16.00 to 17.00
Machine shop turnings	12.50 to 13.50
Cast iron borings	16.50 to 17.50
Heavy axle turnings	15.00 to 16.00
Blast furnace borings and turnings	13.00 to 13.50
Forged scrap	12.00 to 12.50
Bundled skeleton	12.00 to 12.50
Street car axles	28.00 to 30.00
Car wheels	37.00 to 38.00
Machinery cast	40.00 to 41.00
No. 2 cast	36.00 to 37.00
Stove plate	26.00 to 27.00
Railroad malleable	26.50 to 27.50
Rerolling rails	32.00 to 33.00

Buffalo

BUFFALO, Oct. 4.

Pig Iron.—The market is quiet this week with little inquiry and few sales. Most consumers appear to be covered or willing to wait. One maker sold approximately 1000 tons of foundry iron of the various grades at a base price of $50. Another maker sold at least one 100-ton lot of high silicon foundry at $53. Resale iron is a factor in the market and there are reports of No. 2 plain being quoted in this market at $45 to $46.50.

We quote f.o.b. Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$53.00
No. 2 X foundry, 2.25 to 2.75 sil.	51.25
No. 2 plain, 1.75 to 2.25 sil.	50.00
Basic	48.00
Malleable	$47.50 to 48.00
Lake Superior charcoal	58.00 to 60.00

Finished Iron and Steel.—Though there has been somewhat of a tendency on the part of consumers of certain lines to delay purchases until the peculiar conditions governing present-day buying and selling shape themselves more definitely, the week has been marked by activity which indicates that the market has a strong undertone. There has been an improvement in structural shapes. Owing to an increased demand for lots of 100 tons and more and a drop in brick and lumber prices stimulating interest, many observers believe next spring's business will be unusually large. Structural fabricators are running on good time, and in some instances are not promising delivery for earlier than February. The Kellogg Structural Steel Co. will fabricate the steel for a new high school building at Fredonia, N. Y., involving 300 tons. This same company will fabricate for a 200-ton job at the plant of the Buffalo Corrugated Bar Co., Blasdell, N. Y. Miscellaneous smaller jobs have been accepted. While many mill interests are inclined to view the car situation as satisfactory, it is pointed out that undue optimism is a trifle previous. Some interests say that open top equipment above 38 in. in height of sides is more difficult to obtain than ever and because of the fact that the "vacationing" miners are returning to work in certain fields, will be even tighter in the near future. At the same time, the general car situation is considerably improved, according to the viewpoint of most mills. A local sales agency reports, however, that in the Pittsburgh district, some mills have had to resume piling. The price situation shows that there is a disposition to cut on the part of some of the higher premium mills. In some instances where from $15 to $20 premium was being obtained, an adjustment has been made. One mill is asking 3.75c. for its bar steel here, while another is asking 3.25c. One mill here is quoting as low as 3.25c. for plates, though the general asking price is 3.50c. Two good inquiries for plates are before the local market, one for 5000 tons of tank plates from San Francisco, and the other for 5000 tons for a car-building concern in the East. There seems to be, further, a disposition on the part of railroads to inquire for plates. Warehouse prices are apparently holding firm.

Warehouse prices f.o.b. Buffalo are: Steel bars, 4.65c.; shapes, 4.50c.; plates, 4.70c.; No. 10 blue annealed sheets, 7.25c.; No. 28 black sheets, 9.10c.; No. 28 galvanized sheets, 10.40c.; hoops, 6.60c.

Old Material.—The market is very quiet and there have been some reductions in the prices quoted by dealers on certain grades. Heavy melting steel is down to $25 to $26 and clean cast borings are weaker to the extent of $1. Dealers are assiduously seeking material on old orders, but are not contributing greatly to the market. Mills are not anxious to buy any material, being apparently covered for a considerable future time. Now that prices are somewhat depressed, it is probable that there will be a lengthy period of inactivity on the part of buyers. Acceptances of shipments are more regular now, one railroad having taken stringent measures to insure unloading by threatening to close its lines to those shippers who were sending material not according to specifications.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo as follows:

Heavy melting steel, regular grades	$25.00 to $26.00
Hydraulic compressed	22.50 to 23.00
Low phos., 0.04 and under	33.00 to 34.00
No. 1 railroad wrought	31.50 to 32.50
No. 1 machinery cast	40.00 to 41.00
Iron and steel axles	42.00 to 43.00
Car wheels	40.00 to 41.00
Railroad malleable	32.00 to 32.50
Machine-shop turnings	15.00 to 16.00
Heavy axle turnings	19.50 to 20.50
Clean cast borings	20.00 to 21.00
Iron rails	31.00 to 32.00
Locomotive grate bars	25.00 to 26.00
Stove plate	31.50 to 32.50
Wrought pipe	20.50 to 21.50
No. 1 busheling	19.50 to 20.50
Bundled sheet stampings	16.50 to 17.50

Cleveland

CLEVELAND, Oct. 5.

Iron Ore.—Ore shipments during September were 8,923,482 gross tons, a slight falling off as compared with August when the movement amounted to 9,270,763. However, the movement was heavier than in September, 1919, when 8,178,483 tons were shipped. The movement for the season up to Oct. 1 was 44,273,356 tons. This is an increase of 6,496,825 tons over the same period last year, the total Lake movement for the season last year being but 47,177,305 tons. Shipments up to Oct. 1 showed a falling off of 3,956,153 tons as compared with the movement to Oct. 1, 1918, the season's movement that year by water being 61,156,732 tons. If the movement is as heavy from Oct. 1 till the end of the season of navigation as it was two years ago, shipments for the season will reach 57,000,000 tons. While some expect that this amount of ore will be brought down, others are placing their estimates at 53,000,000 to 55,000,000 tons, believing that with the sagging of the demand for and prices of both steel and pig iron, more consumers will ask that ore be canceled or carried over until next year. Consumers feel that if there is going to be a general readjustment of prices to lower levels, ore prices may also be marked down and they are not inclined to carry over more ore than they actually need. In denying reports of the possible ore shortage, ore men declare that there will be plenty of ore for everybody, and should any furnace not have an adequate supply it will have no difficulty in securing all it wants from the large dock stocks, as many consumers will have more ore on the docks than they need.

We quote delivered lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—The interest in the pig iron market is centered in the price situation in respect to basic iron, but hardly enough iron is being sold to establish prices. A Valley consumer has purchased 1000 tons of prompt shipment basic iron at $46 from a Cleveland broker, who also reports the sale of 1000 tons of basic iron for Eastern shipment at $47. Both lots will be shipped from a Valley furnace. The Valley buyer also reports that he has been offered 5000 tons of resale basic from southern Ohio district at $45. In spite of the weakness of the basic market, several sellers are not inclined to shade recent prices on basic. On the whole, the market is duller than it has been for some time. Sales of iron for next year have virtually disappeared, the only sale reported being for 150 tons of malleable iron taken by an Ohio furnace at $47.50 for the first quarter shipment to the East. A few small lot sales of foundry iron are reported for this year's delivery, the usual quotation by Lake furnaces being $47. At least one Valley furnace is also naming this price. A Detroit

plant associated with the automobile industry is understood to have offered some No. 2 iron at $43. Pig iron shipments continue good in spite of a request to hold up deliveries. One interest operating several furnaces reports that its September shipments exceed its make by 4000 tons, and others shipped all the iron they made. However, many requests that shipments be held up are still reaching the blast furnaces and as soon as back orders are filled, some of the furnaces expect that they will have to begin piling iron. That the demand for basic iron has fallen off is indicated by the holding up by two consumers, within the last day or two, of shipments aggregating 5000 tons. Considerable resale foundry iron is being offered by foundries which have more iron than they need under contract because of the falling off of their business. Most of this resale iron was purchased at lower than prevailing prices and foundries are asking for offers for it instead of naming prices.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$47.96 to $48.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$47.56 to 48.56
Southern fdy., 2.25 to 2.75	49.92
Ohio silvery, sil. 8 per cent	63.36
Standard low phos., Valley furnace	58.00 to 59.00

Coke.—The spot foundry coke market is softer and there are liberal offerings of standard Connellsville foundry coke for prompt shipment but practically no demand.

Semi-Finished Steel.—The semi-finished steel market continues weak and consumers, believing that prices will go lower, are buying conservatively. We note the sale of several lots of rerolling billets aggregating 5000 tons at $50 to $55 Ohio mill, mostly at the lower price. A local sale of 80 tons of forging billets has been made at $70, the inquiry bringing out three quotations at that price. A local mill has adjusted sheet bar prices at $65 for October shipment, a decline of $5 from September. In the Chicago territory, 18,000 tons of 2½-in round steel bars offered at $40 a ton at mill have come into competition with billets.

Sheets.—Prices show a further weakening and mills that have been holding to the top prices are anxious to get business at reduced quotations. Automobile body sheets are coming on the market in large quantities, at concession, to 6c. and 7c. from the regular 7.85c. price, but positive information is lacking as to whether mills are naming the lower prices or the concessions are made only on resale sheets. Blue annealed sheets are quoted very generally at the 5c. base for the heavier gages and there are unconfirmed reports that quotations have been made on the basis of 20 per cent above a 3.50c. plate base or 4.20c. Lighter gages are quoted at 5.25c. to 5.50c., black at 6.50c. to 7c. and galvanized at 7.50c. to 8.50c. Some sheet business is being placed for the first quarter subject to prices to be fixed later.

Warehouse Business.—Cleveland warehouse prices on steel bars, which have been somewhat irregular, have been reduced to one price of 3.84c., as compared with the Carnegie Steel Co.'s warehouse price of 3.34c. Warehouses recently reduced their prices on structural material and plates to the Carnegie price. With stock prices on structural material now only $2 a ton higher than the 3.10c. independent mill price with freight added, a large share of the small lot structural orders is being diverted from mills to warehouses. Jobbers now have very good stocks of structural material.

Small machine bolts, rolled threads, 25 to 10 per cent off list; same sizes in cut threads, 25 per cent off list; larger and longer sizes 25 per cent off list; carriage bolts, smaller and shorter, rolled threads, 20 and 10 per cent off; cut threads and larger and longer sizes, 20 per cent off list; lag bolts, 40 per cent off list; plow bolts, Nos. 1, 2 and 3 head, 25 per cent off list, the 20 per cent extra for other style heads being unchanged; machine bolts, both smaller and shorter, and larger and longer sizes, 10 per cent off list; hot pressed sq. and hex. blank nuts, 50c. off list; tapped nuts, list; cold pressed sq. and hex. blank nuts, list plus $1; semi-finished hex. nuts, 40 per cent off list.

Finished Iron and Steel.—Apparently the only late development in connection with recent reductions in automobile prices that affects the steel industry is the refusal of some of the automobile parts manufacturers to cut prices, holding that they cannot do so unless wages are lowered. At least one parts manufacturer who declined to lower his prices received an order on the old basis. The market continues dull. Wire and wire products are in good demand and steel bars are still being sold at 4c. for early shipment, but plates and structural material are unusually dull. Tank plates have generally settled down to 3.25c. and there are unconfirmed reports of 3c. quotations. Some mills have reduced their price on boiler plates from 3.75c. to 3.50c. In the structural field, the only new inquiry is for an 11-story branch bank for the Citizens' Saving & Trust Co., which is expected to require 600 tons. Hard steel bars are softer with 3.75c. as the more general price. Light rails are in good demand.

Cleveland warehouses quote steel bars at 3.34c. to 3.84c.; plates, 3.64c., and structural material, 3.44c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 8.50c.; No. 28 galvanized, 9.50c.; No. 10 blue annealed, 7c.

Bolts and Nuts.—Bolt and nut manufacturers report a good volume of business from various industries outside of the automotive field and railroads. Some consumers are purchasing small lots as they need them, rather than placing contracts. Deliveries of small bolts show no improvement, as manufacturers are finding it as difficult as ever to secure shipments of wire. Makers say that they have no trouble in taking business at the recent advance in price, although three or four manufacturers are still quoting the old prices. The demand for rivets shows some improvement. Local manufacturers quote rivets at 4.75c. for structural rivets and 4.85c. for boiler rivets.

Old Material.—The scrap market continues very dull, with activity confined to trading between dealers who are still buying in limited lots to fill old orders. Sales are limited mostly to heavy melting steel, compressed steel and borings and turnings. These grades are 50c. to 75c. a ton lower than a week ago. The supply of nearly all grades of scrap is plentiful.

Heavy melting steel	$25.25 to $25.75
Steel rails under 3 ft	28.00 to 29.00
Steel rails rerolling	38.00 to 39.00
Low phos. melting scrap	27.00 to 27.50
Cast borings	16.25 to 16.50
Machine shop turnings	12.00 to 12.25
Mixed borings and short turnings	16.25 to 16.50
Short turnings for blast furnaces	16.25 to 16.50
Compressed steel	21.50 to 22.00
Steel axle turnings	21.00 to 21.50
Light bundled sheet stampings	14.00 to 14.50
Drop forge flashings over 10 in	18.50 to 19.00
Drop forge flashings under 10 in	18.50 to 19.00

Arthur G. McKee & Co. of Cleveland have recently taken a contract for a revolving distributor for No. 1 furnace of the Donner Steel Co., Buffalo, and for improvements to the Rockdale, Tenn., furnace of J. J. Gray, Jr.; also an order for a four unit Kling-Weidlein gas cleaner for the Clarence Iron Works plant of Bell Bros., Middlesbrough, England.

The Mahoning State Line Railroad Co., a property of the Pittsburgh & Lake Erie, has commenced work on a three-mile extension from Hillsville, Pa., to Bessemer, Pa. The road is now four miles in length, from Lowellville Junction to Hillsville, and hauls most of the flux stone used by Mahoning Valley furnaces. The addition will connect with the new cement plant of the Bessemer Limestone & Cement Co., Youngstown, Ohio, and with the brick plant of the Metropolitan Paving Brick Co. of Canton, Ohio. The Bessemer company is completing a plant to produce cement which will have a production of 1,000,000 barrels a year.

The Cambria Steel Co., Johnstown, Pa., has awarded a contract to the Arthur G. McKee Co., 2422 Euclid Avenue, Cleveland, for the construction of a new three-story sintering plant, 60 x 172 ft., to cost about $500,000, with equipment.

New York

NEW YORK, Oct. 5.

Pig Iron.—The most encouraging feature of the situation continues to be the general receipt of shipments by founders. It is true, of course, that there have been some suspensions and cancellations, the latter particularly in cases in which the iron is not delivered on time in strict accordance with contracts. Leading sellers report that there are more requests for hurrying shipments than for suspending them. There is almost no buying and prices remain untested. Virginia iron is obtainable at $48, furnace, or $54.16, New York, but no sales are reported. Resale iron is generally disposed of at from $3 to $4 lower than the regular quotations.

We quote for delivery in the New York district as follows, the higher quotations being for prompt delivery and the lower the first half of 1920, except on Virginia iron, on which the price for first half is the same as for prompt:

East. Pa., No. 1 fdy., sil. 2.75 to 3.25	$55.52 to $57.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	53.77 to 55.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	52.52 to 54.52
Buffalo, sil. 1.75 to 2.25	54.46
No. 2 Virginia, sil. 1.75 to 2.25	54.16

Ferroalloys.—Demand for ferromanganese has not improved and it is evident that consumers are well stocked for at least the rest of the year. Quotations are unchanged on a basis of $170, seaboard, for either the foreign or domestic alloy. A few lots of resale alloy are available around $160 to $165 and a few sales are heard of. Imports in August are reported to have been 9804 gross tons, which is the largest for any month this year and for some time previous. The total for the eight months this year was practically twice what it was in the same period of 1919, or 33,515 tons. The spiegeleisen market is inactive with the higher grade quoted at $82.50, furnace, and the lower grade at $80. There is no demand for manganese ore, consumers being well provided for and imports very large, those for August having been 99,601 tons or the heaviest for any month this year. The 50 per cent ferrosilicon market is also quiet at $75 to $85, furnace. Quotations for lump ferrotungsten, guaranteed, are 90c. per lb. of contained tungsten; for the same, not guaranteed, the quotation is 60c. The alloy in powder is 80c. to 85c per lb. of contained tungsten, with maker's specific guarantees free from tin, under 0.05 per cent sulphur and phosphorus. Tungsten powder, 96 to 98 per cent, is quoted at 95c. to $1.05 per lb. All these prices are f.o.b. maker's works. Ferrovanadium is quoted at $6.50 to $7 per lb. of contained vanadium in wholesale lots for early delivery, but these are nominal, the alloy being exceedingly scarce. Small lots for prompt delivery are selling above $7. Ferrocarbontitanium, 15 to 18 per cent, is selling at $200 per net ton in carload lots, at $220 per ton in lots between one ton and a carload, and at $250 per ton in lots less than a ton, f.o.b. Suspension Bridge, N. Y.

Finished Iron and Steel.—A factor which has to do with the stagnation in buying is the speedy movement in recent weeks of the accumulations at mills of finished products and consequently the absorption by manufacturing consumers not only of the current output of the mills, but also of the volume of material which the railroads have only lately been able to carry. Beyond this the market is essentially in the hands of the buyer. That sellers are actually resisting a decline, particularly those who have high manufacturing costs through the fact that they are not integrated, is shown in a quotation by at least four of them on several hundred tons of plates of 3.50c., Pittsburgh. This is to be considered against the purchase of 3000 tons by a car builder for fairly prompt shipment at 3c., and of another attractive lot from an independent also for early delivery at the Steel Corporation's price of 2.65c. The plate market is, however, quotable at 3.25c., Pittsburgh, in a few weeks, the qualification being that attractive lots are doubtless obtainable at $1 to $3 below this figure. So far the best price an exporter has secured on about 2000 tons is 3.25c., Pittsburgh. Resale lots of steel bars have been market features, round lots having sold at 3c. Mills are more actively seeking steel bar business even for the smaller sizes, and some mills are apparently not averse to considering 3.25c. for moderately large lots, though the market may be stated at 3.25c. to 3.75c., Pittsburgh, depending on size and delivery. Plain structural material remains at 3.10c., Pittsburgh, but relatively little is doing in fabricated steel work, a fact which is reflected in an extremely easy market in universal plates. Sheets in the heavier gages are easy and in fairly free supply, but there is no surplus as yet of the light gages. Cold drawn steel is freely quoted at 4.25c., Pittsburgh, or less, whereas a short time ago sales were being made up to 6.50c. Eastern consumers of hot and cold rolled strip steel have not held up shipments to the extent that has occurred in the automobile producing districts, but strip steel is now to be had for fairly prompt shipment, independent makers quoting 5.50c. on hot rolled and 8.50c., Pittsburgh, on cold rolled. The leading interest quotes 6.25c. on cold rolled. Production tin plate is difficult to get, but there are fairly good stocks in the hands of jobbers. The price of export tin plate, which went as high as $12 per base box, has softened, many export lots at seaboard points now being offered for resale at $1 or $2 under that price. The structural steel market is extremely quiet, though this is the time when projects for spring construction usually come into the market. Declining prices of many building materials are undoubtedly the principal factor in holding up inquiries for structural steel. Bids have been requested on 200 tons for an addition to Johns Hopkins Hospital, Baltimore; bids are in on a highway bridge in Chatham County, North Carolina, requiring 400 tons. The factory of the Champion Fibre Co., Canton, N. C., will be built of reinforced concrete; 400 tons of fabricated steel had been inquired for. The bar iron market is fairly firm at 4.50c., Pittsburgh, though a desirable specification might find a seller willing to accept 4.25c., this latter price ruled in one or two recent transactions.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c. to 4.13c.; shapes, 2.83c. to 3.48c.; plates, 3.03c. to 3.88c., the minimum prices being for indefinite delivery and the highest prices for delivery in a few weeks; bar iron, flats, wider than 6 in., 5.38c., with half extras; light rounds, squares and flats, 5.88c. with full extras, and other sizes, 4.88c., with half extras.

Cast-Iron Pipe.—The first sizable municipal inquiry for some time is that of the city of Columbus, Ohio, for 4400 tons of 30 in. to 42 in., bids to be opened Oct. 19. Demand from private sources still remains active and thousands of tons of orders are turned away because of inability of makers to promise deliveries soon. Prices are well maintained and premiums offered in some cases. We quote f.o.b., New York, 6-in. and larger, $77.22; 4-in., $87.22; 3-in., $97.22, with $2 additional for Class A and gas pipe.

Old Material.—Prices are lower on borings and turnings, iron and steel pipe and forge fire, with the tendency downward on the entire list. However, there are so few transactions as to make the gaging of market prices difficult. There is a good supply of nearly all grades and but little demand.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$19.50 to $20.50
Rerolling rails	35.00 to 37.50
Relaying rails, nominal	55.00 to 56.00
Steel car axles	38.00 to 39.00
Iron car axles	44.00 to 45.00
No. 1 railroad wrought	27.50 to 28.50
Wrought iron track	20.00 to 21.00
Forge Fire	11.00 to 11.50
No. 1 yard wrought long	25.00 to 26.00
Light iron	9.00 to 10.00
Cast borings (clean)	17.50 to 18.00
Machine-shop turnings	13.50 to 14.00
Mixed borings and turnings	13.00 to 13.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	17.00 to 18.00
Stove plate	24.50 to 25.50
Locomotive grate bars	27.00 to 27.50
Malleable cast (railroad)	25.50 to 26.50
Old car wheels	37.00 to 38.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$39.00 to $41.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	38.00 to 39.00
No. 1 heavy cast not cupola size	28.00 to 29.00
No. 2 cast (radiators, cast boilers, etc.)	28.00 to 29.00

Warehouse Business.—Although stocks are increasing in volume, they are not improving greatly in diversity of sizes. A majority of warehouses have decreased their prices on soft steel bars, beams and channels,

angles and tank plates. The average reduction in price amounts to about 65c. per 100 lb. Tank plates have been dropped 30c. per 100 lb. from $4.80 to $4.50. A large independent warehouse has revised its quotations on sheets, reducing black and galvanized sheets 1c. per 100 lb. and increasing the price of blue annealed sheets 2c. per 100 lb. Brass sheets, tubes, wire, copper sheets and similar material have been reduced about 1c. per lb. This is the first recorded change in these prices made since January of this year. Corrected quotations will be published in THE IRON AGE Oct. 14. We quote prices which have prevailed on page 964.

High Speed Steel.—Slackness in the high speed steel market continues. Domestic producers quote 18 per cent tungsten high speed steel at $1.25 per lb., New York. Contracts are made at less than this price by most producers.

Cincinnati

CINCINNATI, Oct. 5.

Pig Iron.—The market is exceptionally dull, and it is doubtful whether total sales in this territory during the week amounted to 1200 tons. The largest individual sale reported was for 300 tons of Southern iron for prompt delivery into Indiana on the prevailing schedule, $42, Birmingham, for the base grade. Three sales, aggregating 500 tons, of Southern iron were made for first quarter delivery at the same price. A small tonnage of Northern iron was disposed of at $46, Ohio furnace, and some carload lots of Jackson County silvery iron were taken at the full schedule, $60, furnace, for 8 per cent. Very little inquiry is before the trade. The Louisville & Nashville has not yet purchased on its inquiry for 1600 tons. A Louisville melter is in the market for 500 tons of foundry, and a northern Indiana concern wants 300 tons. Resale iron continues to come on the market, and many of the sales made are of these tonnages, the sellers being satisfied to accept prices from $2 to $4 under the market. Furnaces in this district are not actively soliciting business, and for this reason it is difficult to get a line on the market. Those that have quoted on the small inquiries pending have named the full market price. Buyers generally are showing little interest just now, as they are expecting lower prices to develop in the near future. Most of them bought pretty freely during the early summer when it looked as though there would be a big shortage on account of poor shipments on contracts, but now that conditions have improved they find that they have enough iron, at the present rate of melting, to carry them well over the remainder of the year. It is reported that some furnaces, should the present dull period continue for any length of time, will go out of blast when their contracts have been filled rather than pile iron on their yards at the present high cost of production. Chattanooga and Sheffield furnaces in the South have been banked, and Jisco furnace at Jackson, Ohio, at which an accident occurred on Sept. 25, was blown out Oct. 1 for repairs, which will likely be completed in 60 days.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$46.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	47.75
Ohio silvery, 8 per cent sil	62.52
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	48.52
Basic Northern	48.52
Malleable	48.52

Finished Material.—The demand for finished materials has fallen off to some extent, but prices remain unchanged. Reports are current that billets were offered in this market during the week at $48 to $50, but confirmation is lacking. Some mills are offering No. 10 blue annealed sheets at 5.25c., but the old prices are still in effect for Nos. 14 and 16. The demand for black and galvanized sheets holds steady, as stocks are low. On bars lower prices are expected. Warehouses report a falling off in business during the week, though September was a fairly good month. They note a tendency on the part of consumers to buy only for immediate needs. With the exception of blue annealed sheets, which have been marked down from 7.50c. to 7c., prices remain unchanged. Reductions are expected, however, in the immediate future. With the exception of black and galvanized sheets, stocks in local warehouses are in fair shape, and shipments are coming through in good time. The scarcity in wire products continues, but jobbers are expecting better things shortly. Slight improvement has been noted in shipments of nails. Bolt and nut makers supplying the trade in this territory have advanced their prices for the fourth quarter approximately 10 per cent over those prevailing for the third quarter.

Iron and steel bars, 5c. to 5.50c.; structural shapes, 4.50c.; plates, 4.50c.; cold rolled shafting, 6.25c.; steel bands, 6.50c.; No. 10 blue annealed sheets, 7c.; No. 28 black sheets, 9 to 10c.; No. 28 galvanized sheets, 10c. to 11c.; wire nails, $4.50 per keg base.

Coke.—The coke market is easier as regards shipments, and in some instances lower prices are quoted. Dealers report that the demand from this district is very small. The Indianapolis by-product producer continues to renew contracts for the full year of 1921 at a sliding scale based on the price it pays for its coal. Connellsville furnace coke was offered last week at $16.50, ovens, 50c. under the previous quotation, and foundry at $18. Wise County coke is easier at $16 to $16.50 for furnace, and $18 for foundry. Some small tonnages of New River foundry were offered last week at $19.

Old Material.—The scrap market is weaker, and prices on most items were marked down $1 to $2 during the week. There is a fair demand for relaying and rerolling rails and cast scrap, and prices on these items remain at the old levels. Very few inquiries are being received, and trading is confined to small lots. Dealers report consumers are rejecting materials not strictly up to specifications.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$12.50 to $13.50
Old iron rails	25.50 to 26.50
Relaying rails, 50 lb. and up	49.50 to 50.50
Rerolling steel rails	30.50 to 31.50
Heavy melting steel	20.50 to 21.50
Steel rails for melting	21.50 to 22.50
Car wheels	35.50 to 36.50
Per Net Ton	
No. 1 railroad wrought	$22.50 to $23.50
Cast borings	9.50 to 10.00
Steel turnings	8.00 to 8.50
Railroad cast	31.50 to 32.50
No. 1 machinery	34.50 to 35.50
Burnt scrap	21.50 to 22.50
Iron axles	34.00 to 34.50
Locomotive tires (smooth inside)	22.00 to 23.00
Pipes and flues	13.50 to 14.00
Malleable cast	23.50 to 24.00
Railroad tank and sheet	13.50 to 14.00

St. Louis

ST. LOUIS, Mo., Oct. 4.

Pig Iron.—In the pig iron market there was very little activity, the aggregate sales, all for immediate needs and therefore for prompt delivery, running only a few hundred tons. The consuming interests are more disinclined than ever to make any purchases in the present state of the market, looking for the most part for reductions in price. Inasmuch as most of the foundries have reasonable supplies of iron on hand or contracted for, there is no immediate occasion for any large commitments and hence the tendency to stay out of the market until the price situation in general commodities, with the effect on the iron and steel business, becomes more stabilized. There have been no changes in pig iron prices, but it is very doubtful if any sales could be made at the present figures except in the case of small lots for urgent needs.

Coke.—No trading in coke developed during the week, the users being well supplied for immediate and early needs and the price being held as too high for consideration at present.

Finished Iron and Steel.—In finished products there was no apparent change in the situation, as mill representatives have more orders on their books than they can satisfactorily deliver, and consumers, aside from urging forward material under contract, are unwilling

to commit themselves any further at the present time.

We quote for stock out of warehouse as follows: Soft steel bars, 4.07½c.; iron bars, 4.50c.; structural material, 4.17½c.; tank plates, 4.37½c.; No. 10 blue annealed sheets, 7.27½c.; No. 28 black sheets, cold rolled, one pass, 8.20c.; No. 28 galvanized, black sheet gage, 9.70c.

Old Material.—The scrap market continues soft, with dealers afraid to either buy or sell, and consumers entirely out of the market. There is not even any trading among the dealers, as is usual at most times, and in conjunction with this the dealers are waiting the usual lists which come out at this time of the month, and which have been, apparently, delayed by the railroads because of the soft market and a lack of disposition to make offerings on a declining market.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$31.00 to $31.50
Old steel rails, rerolling	34.00 to 34.50
Old steel rails, less than 3 ft	22.00 to 22.50
Relaying rails, standard sections subject to inspection	45.00 to 50.00
Old car wheels	34.50
No. 1 railroad heavy melting steel	22.50 to 23.00
Heavy shoveling steel	21.00 to 21.50
Ordinary shoveling steel	20.50 to 21.00
Frogs, switches and guards, cut apart	22.50 to 23.00
Ordinary bundled sheets	11.00 to 11.50

Per Net Ton

Heavy axles and tire turnings	$13.00 to $13.50
Iron angle bars	28.00 to 28.50
Steel angle bars	20.50 to 21.00
Iron car axles	39.00 to 39.50
Steel car axles	32.00 to 32.50
Wrought arch bars and transoms	31.00 to 31.50
No. 1 railroad wrought	22.50 to 23.00
No. 2 railroad wrought	21.50 to 22.00
Railroad springs	20.50 to 21.00
Steel couplers and knuckles	22.00 to 22.50
Locomotive tires, 42 in. and over, smooth inside	18.00 to 18.50
Cast-iron borings	12.50 to 13.00
No. 1 busheling	19.00 to 19.50
No. 1 boiler, cut to sheets and rings	15.00 to 15.50
No. 1 railroad cast	32.00 to 32.50
Stove plate and light cast	24.00 to 24.50
Railroad malleable	22.50 to 23.00
Agricultural malleable	21.50 to 22.00
Pipes and flues	16.00 to 16.50
Heavy railroad sheet and tank	15.00 to 15.50
Railroad grate bars	23.50 to 24.00
Machine-shop turnings	10.50 to 11.00
Country mixed	18.00 to 18.50
Uncut railroad mixed	19.00 to 19.50
Horseshoes	24.50 to 25.00
Brake shoes	20.50 to 21.00

Birmingham

BIRMINGHAM, ALA., Oct. 5.

Pig Iron.—Some Birmingham iron interests say they have not placed a single order on their books during the first few days of October and the week preceding. No maker reports the placing of an order for as much as 1000 tons. One large maker continues to sell small lots for spot delivery, which are evidently called for by scattered consumers whose shipments have been delayed or by those here and there who had not fully covered requirements. Very little of the inquiry is for forward delivery and only one inquiry for a small tonnage for 1921 delivery was received. One rush inquiry for 100 tons came from Philadelphia. It is evident that the consumers have adopted a waiting attitude, and there seems to be some hope on their part that prices will be lower. Much interest exists in what the Tennessee Coal, Iron & Railroad Co. may do in the foundry market. For the present, it has made no move, or given indications that it will enter the foundry market to any extent. This interest has just received 8000 tons of manganese ore from Brazil and, it is understood, will blow in a stack at Bessemer for the production of ferromanganese. None of the operations of the Tennessee company either in iron or in steel had been affected by the strike up to the close of the week. Operations in all plants were reported at normal. Wire mills are contenting themselves with supplying the wants of regular customers. Very little new business of any kind is reported in any of the finishing mill lines. The Sloss-Sheffield company still operates four blast furnaces, having blown out a stack at Sheffield prior to the general strike for repairs.

We quote per gross ton f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sil. 1.75 to 2.25	$42.00
Basic	41.00
Charcoal	60.00

Old Material.—The scrap market has sagged during the past week and the present quotations may be regarded as nominal with sales under them in case good offer of large tonnage is made. In another week, unless there is a change for the better, prices will be marked down.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	$24.00 to $25.00
Heavy melting steel	23.00 to 24.00
No. 1 cast	35.00 to 36.00
Car wheels	34.00 to 35.00
Tramcar wheels	33.00 to 34.00
No. 1 wrought	28.00 to 29.00
Stove plate	26.00 to 27.00
Cast iron borings	13.00 to 14.00
Machine shop turnings	13.00 to 14.00

British Iron and Steel Market

More Mills Closing—Competition from Belgium —Semi-finished Steel $5 Lower

(*By Cable*)

LONDON, ENGLAND, Oct. 5.

The postponement of the coal strike to Oct. 16 means that an arrangement or some settlement is probable. The men are less strongly united, and mine owners are offering concessions based upon a guaranteed minimum output rate of 240,000,000 tons annually.

Markets appear to be stagnating. Buyers are no longer willing to pay the prices demanded. Growing unemployment is notable in all directions, with mills and works closing. The United Steel Co. has given notice to large numbers of men in Sheffield, and similar action applies to Wales and the Midlands.

In the present state of industrial unrest, works generally refuse to quote or to accept bookings. The basic conditions governing the pig iron market are unaltered. Foreign ore freight rates have hardened slightly, and Bilbao Rubio has been done at 50s. ex-ship, Tees.

Shipbuilding figures are good for September, but the yards are getting through with contracts and a slump is in sight, because new bookings have long ceased to be a fact. On the Clyde in September, 23 vessels of 57,753 tons were built, and the nine months' total is 464,791 tons. The Tees September record is 59,350 tons.

Steel prices are weakening, partly under the influence of foreign competition. Belgian billets are quoted at £17 10s. c.i.f., United Kingdom [$61.25 with exchange at $3.50]. Belgian [sheet] bars have sold at £16 7s. 6d. [$57.30] delivered, United Kingdom. Welsh bar makers are offering a big cut to the East Coast consumers, though trying to maintain prices locally. The position is wholly artificial.

We quote per gross ton except when otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.50 for £1, as follows:

Ship plates	£26	0	to £33	0	$91.00 to	$115.50
Boiler plates	30	0	to 35	0	105.00 to	122.50
Tees	26	10	to 32	0	92.75 to	112.00
Channels	25	15	to 31	5	90.13 to	105.38
Beams	25	10	to 32	0	89.25 to	112.00
Round bars, ¾ to 3 in.	28	0	to 33	0	98.00 to	115.50
Rails, 60 lb. and up	25	0	to 27	0	87.50 to	94.50
Billets	20	0	to 21	0	70.00 to	73.50
Sheet and tin plate bars, Welsh	21	0	to 22	0	73.50 to	77.00
Galvanized sheets, 24 g.	38	0	to 40	0	133.00 to	140.00
Black sheets, 24 g. to 26 g.	50	0	to 54	0	175.00 to	189.00
Tin plate base box*	2	11			8.93	
Steel hoops	38	15	to 39	0	135.63 to	136.50
Cleveland basic iron	11	15			41.13	
West Coast hematite	15	15			55.13	
Cleveland No. 3 foundry	11	5			39.38	
Ferromanganese	35	0	to 40	0	122.50 to	140.00
Coke	3	2¾			10.98	

*Prompt delivery: for Nov.-Dec. 49s. ($8.58) for January.

Philadelphia

PHILADELPHIA, Oct. 5.

The market is at a standstill. All materials are affected in very much the same way. The weakness which has prevailed in steel products has now spread to pig iron. While furnace prices on iron are not quotably lower, the market shows the unsettlement which is the usual forerunner of easier price conditions. Significant developments are cancellations and suspensions of iron contracts, together with the more frequent appearance of resale lots at prices $2 or $3 a ton below those quoted by Eastern furnaces. Iron has been sold in transit, a somewhat unusual practice in the pig iron trade, though common in the scrap trade, this being due to the unwillingness of some consumers to take iron on the way to them from the furnaces. In steel products the situation is the same as prevailed a week ago. The almost entire absence of business recalls conditions which existed shortly after the signing of the armistice. There are no attractive tonnages to test prices; consequently there is a halt in the decline which some prices have been undergoing. In the case of plates, sellers express confidence that the market has touched bottom, so far as independent mills are concerned, at 3.25c., Pittsburgh. The scrap market has had another quiet week, in which there have been numerous price declines.

Pig Iron.—Resale iron is appearing more frequently, but the apathy of consumers is so marked that concessions of $2 or $3 a ton have failed in some instances to move small lots. An Eastern steel maker has offered 200 to 300 tons of iron at prices based on $49, furnace, but a circular letter sent out by a broker, offering this iron to a large number of consumers in this district, met with little response. It is reported that several lots of Virginia iron have been resold on a basis of $47, Virginia furnace, but this is not confirmed. However, one of the Virginia furnaces is now quoting on the basis of $48, furnace, for first quarter shipment. Other iron, located in the Philadelphia district, has been sold at prices approximating $48, shipping point. Some of the western Pennsylvania furnaces are offering iron at $49, furnace, but with their high freight rate to Philadelphia or vicinity, the delivered prices are still somewhat above those paid when iron is bought from furnaces near by. Valley basic iron has been offered to an Eastern steel company, it is reported, at $44, furnace, but the high freight rate does not make the iron cheap when delivered in this locality. An indication that some consumers of foundry iron are getting more than they need and are not anxious to stock iron at the present high prices is afforded by the sale of several cars in transit. There have been cancellations and suspensions also of pig iron contracts. The cancellations are due largely to the fact that furnaces were unable to ship spot iron owing to railroad conditions, and show a willingness to relieve the buyers of their obligations under such circumstances. The principal sale of the past week was 5000 tons of copper bearing low phosphorus iron at $57, furnace.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa. No. 2 plain, 1.75 to 2.25	$52.26 to $52.54
East. Pa. No 2X, 2.25 to 2.75 sil.	53.51 to 53.79
Virginia No. 2 plain, 1.75 to 2.25 sil.	53.74 to 55.74
Virginia No. 2X 2.25 to 2.75 sil.	54.99 to 56.99
Basic deliv. Eastern Pa.	51.26 to 51.52
Gray forge (nominal)	47.10 to 48.50
Standard low phos. (f.o.b. furnace)	60.00
Malleable	53.75
Copper bearing low phos. (f.o.b. furnace)	57.00

Ferroalloys.—The market is extremely quiet. There is virtually no demand for ferromanganese or spiegeleisen. The former is quoted for resale at $160 to $165, seaboard, but British agents and domestic makers continue to quote $170, seaboard. Spiegeleisen is held at about $80, furnace.

Semi-Finished Steel.—There were sales within the past week of 700 tons of open-hearth rerolling billets at $55, Pittsburgh. On one inquiry a $60 quotation failed to interest the prospective buyer. Forging billets are quoted at $65, Pittsburgh.

Plates.—Eastern independent plate mills seem determined not to permit their quotations to go below 3.25c., Pittsburgh. While sales are reported at $1 to $3 below this figure, it is stated here that Western mills are taking the business. One or two mills are still quoting 3.50c., and are getting some orders for specification plates on this basis. The Baldwin Locomotive Works is expected to place orders this week for steel for 50 Baltimore & Ohio locomotives and 25 Illinois Central locomotives. We quote ¼-in. and heavier sheared plates at 3.25c., Pittsburgh.

Structural Material.—The market is devoid of features of interest. No building projects are coming out. Eastern mills are generally quoting 3.10c., Pittsburgh, though 3.15c., mill, is reported to have been the price on several sales by an Eastern maker. We quote plain material at 3.10c., Pittsburgh.

Bars.—The bar market is quiet, but occasional lots are being sold at prices ranging from 3.25c. to 4c., depending on sizes and delivery. One mill is quoting sizes ⅜ in. and larger at 3.50c., Pittsburgh. Bar iron is held at 4.50c., Pittsburgh, by one of the largest Eastern producers, but an occasional lot is being sold by other mills at 4.25c., Pittsburgh, this price applying usually on very desirable specifications. We quote mild steel bars at 3.25c. to 3.50c., Pittsburgh, and bar iron at 4.50c., Pittsburgh.

Old Material.—The scrap market is quiet and prices are lower. There is very little trading. We quote for delivery at consuming points in this district, as follows:

No. 1 heavy melting steel	$23.00 to $24.00
Steel rails, rerolling	38.00 to 39.00
No. 1 low phos., heavy 0.04 and under	33.00 to 34.00
Car wheels	41.00 to 43.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 yard wrought	26.00 to 27.00
No. 1 forge fire	17.50 to 18.00
Bundled skeleton	17.50 to 18.00
No. 1 busheling	20.00 to 21.00
No. 2 busheling	17.00 to 18.00
Turnings (short shoveling grade for blast furnace use)	18.00 to 19.00
Mixed borings and turnings (for blast furnace use)	17.00 to 17.50
Machine-shop turnings (for rolling mill and steel works use)	18.50 to 19.50
Heavy axle turnings (or equivalent)	20.00 to 21.00
Cast borings (for rolling mills)	22.00 to 23.00
Cast borings (for chemical plants)	24.00 to 25.00
No. 1 cast	39.00 to 40.00
Railroad grate bars	29.00 to 30.00
Stove plate (for steel plant use)	26.50 to 27.00
Railroad malleable	27.50 to 28.50
Wrought iron and soft steel pipes and tubes (new specifications)	22.00 to 23.00
Iron car axles	45.00 to 46.00
Steel car axles	42.00 to 44.00

American Pig Iron Association Meeting

Much of the optimism which pervaded the previous meeting of the American Pig Iron Association held in July was lacking at the meeting held at the William Penn Hotel, Pittsburgh, Sept. 29, at which it was developed that both inquiries and sales recently have been almost nil and that while the merchant producers who comprise the membership of the organization were well sold up over the remainder of the year, none had any considerable amount of 1921 business other than might be provided by tonnage carried over from this year through lack of shipping instructions or in the shape of the usual reservations against the requirements of regular customers. It also is understood that the official reports disclosed shipments during the past month in excess of production and a considerable cut in unfilled orders had been made. Much satisfaction is reported to have been expressed over the way gray iron foundries were taking in and using iron, but since the meeting one of the largest users of foundry iron, with plants in Pittsburgh and Cleveland, has issued orders stopping all shipments.

The Westinghouse Electric & Mfg. Co. announces that it has received within the past three months orders from electric power companies for over a half million horsepower of turbine-generators. Among the orders are the following: Cheswick Power Co., Pittsburgh, one unit of 60,000 kw., one of the largest engines ever built; and Narragansett Electric Light Co., one unit of 45,000 kw.

EXPORTS WAIT ON PRICES

Japanese Price Decline Continues—France Buys Pipe Line—Scotland Rails

A majority of exporters are viewing the price reductions in certain materials with satisfaction, believing that when prices have reached a lower level and become stable foreign buyers will again become active. Some markets show some activity in buying, particularly England from which small orders have been coming for ship plates. One exporter in New York has recently booked orders for several small tonnages of plates to England, Holland and Sweden totaling about 1200 tons and about 300 tons of angles. Prices on plates, according to offers to exporters from mills are from 3.05c. to 3.10c. per lb., Pittsburgh, on large tonnage. An exporter in New York who ships from the port of Philadelphia was recently quoted 3.25c. per lb., Philadelphia on a moderate sized order of plates.

Two outstanding developments are the sale of 10,000 tons of girder rails for the Glasgow tramways and the sale of 15,000 tons of plates for a 132-mile oil pipe line from Le Havre to Paris, both made by the United States Steel Products Co. In the matter of street railway rails, the transaction appears to have hinged largely on the desire to secure the American section, which will be rolled by the Lorain Steel Co. for delivery in the first four months of 1921. The transaction recalls like sales to Leeds, Birmingham and Manchester, England, the one to Birmingham in March, 1919, creating quite a little discussion in the British press, partly through a fear that it might mean a further invasion of American steel into England. The oil pipe line material, which has been under negotiation for some weeks, is to be supplied late this year.

Although the adverse exchange with South America precludes any large transactions, exporters continue to receive small orders to satisfy immediate needs. The Dutch East Indies is still the only active market in the Far East. Japan shows a steady decline in prices of iron and steel since the middle of August, with the exception of pig iron quotations which remain stiff at 95 yen per ton. Rumored purchases of pig iron by Japanese consumers are not confirmed. The following prices compared with those prevailing Sept. 8, serve to show the decline during the past few weeks:

	Sept. 30 Yen	Sept. 8 Yen
Steel bars	145	150
Shapes	180	190
Plates	145	150
Sheets, 1/16 in. to 3/32 in.	210	230
Sheets, Nos. 23 to 28	235	245
Sheets, galvanized, No. 28	445	470
Tinplate, per box	16½	17
Wire, No. 8 galvanized	192	230
Nails, per keg, 133⅓ lb.	17½	16
Pig iron	95	95

A merger of the iron and steel interests of Japan is proposed. It is believed that such an amalgamation, which would include most of the shipping lines, would aid foreign trade, insure financial stability, provide more economical production and lead to the ultimate standardization of iron and steel products made in Japan.

Conditions in Belgium

BRUSSELS, BELGIUM, Sept. 9.—About 100 locomotives are now nearing completion in Belgian shops, which will greatly improve transportation conditions in the country when they are added to the orders being filled by American and British manufacturers. The foreign shops have been slow in making deliveries, but Belgian concerns have not been much better. Delivery of 1500 freight cars, the first part of an order for 5000 cars placed with Belgian shops some time ago, has been delayed. Considerable surprise was caused in Belgian markets by the recent report that Rumania had placed an order for 80 locomotives with shops in Czecho-Slovakia. It was not believed possible that Czecho-Slovakia was economically able to handle such an order.

With the recovery of the pound sterling, British buyers find it profitable to purchase in Belgium regardless of the possibilities of lower quotations in a few weeks. These buyers are again giving attention to offers of Belgian bar iron which has been quoted at £24 for No. 2, f.o.b. Antwerp.

IRON AND INDUSTRIAL STOCKS

Steel Securities Under Pressure, While Selling of Equipments Lets Up

The securities market has continued a two-side affair during the past week, with the railroad issues the strong features and industrials the weak. Buying of railroad stocks has been based on indicated larger earnings as a result of the new freight and passenger rates, and the splendid crop outlook. The selling of industrials is based on expectations of lower prices for manufactured products and the decreasing demand for same.

Steel stocks have been under noticeable pressure of late and some of them are selling at, or close to, the low prices for the year. Republic Iron and Steel and Bethlehem Steel issues have suffered the largest decrease in market valuation.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	32¼ - 34½	Lackawanna Steel	60 - 65
Allis-Chalm. pf.	73½ - 75	Lake Sup. Corp.	11 - 11¼
Am. Can. com.	31 - 34¾	Midvale Steel	37⅛ - 39¼
Am. Can pf.	85¾ - 87⅞	Nat.-Acme	32 - 32¾
Am. C. & F. com	131½ - 135½	Nat. E. & S. com.	56½ - 58¼
Am. C. & F. pf.	— - 110¼	N. Y. Air Brake	92⅛ - 97½
Am. Loco. com.	93 - 96¾	Nova Scotia Steel	40 - 40¾
Am. Loco. pf.	101 - 101½	Pittsburgh Steel pf	— - 90
Am. Radiator com.	— - 73	Press. Steel com.	92¾ - 96⅞
Am. Steel F. com.	35½ - 36½	Press. Steel pf.	99 - 99⅛
Am. Steel F. pf.	— - 86	Ry. Stl. Spg. com.	93¼ - 96
Bald. Loco. com.	106¾ - 112¾	Ry. Stl. Spg. pf.	— - 102¼
Beth. Steel com.	65¼ - 68¼	Replogle Steel	77 - 82⅞
Beth. Stl., Cl. B.	67½ - 72⅛	Republic com.	72¾ - 78¼
Beth. Stl., 8% pf.	104 - 105	Republic pf.	94 - 95¼
Case, J. I., pf.	80½ - 85	Sloss com.	62 - 68
Chic. Pneu. Tool.	78 - 80¾	Superior Steel	48¼ - 51
Colorado Fuel	32⅛ - 33	Transue-Williams	43 - 46
Cruc. Steel com.	125½ - 133	Un. Alloy Steel	37 - 38½
Cruc. Steel pf.	— - 93½	U. S. Pipe com.	13 - 14⅞
Gen. Electric	141¼ - 143	U. S. Steel com.	85¼ - 89¼
Gt. No. Ore Cert.	33½ - 34¼	U. S. Steel pf.	106¼ - 107¼
Gulf States Steel	— - 50	Vanadium Steel	64¼ - 68⅜
Int. Har. com.	111¾ - 115	Westingh'se Elec.	46 - 48
Int. Har. pf.	— - 107		

Union Rolling Mill Co. Merged with Bourne-Fuller Co.

CLEVELAND, Oct. 5.—The Union Rolling Mill Co., Cleveland, operating eight 9-, 18- and 21-in. mills for the manufacture of steel and iron bars, has been merged with the Bourne-Fuller Co. and this plant will hereafter be known as the Union Mill of the latter company. J. E. Kreps, formerly vice-president and treasurer, and M. L. Hopkins, formerly secretary of the Union Rolling Mill Co., are now associated with the Bourne-Fuller Co. as vice-president and secretary respectively.

Export Catalog Arranged in Four Languages

A catalog of particular interest because of the arrangement and listing of products in English, Spanish, Portuguese and French has been prepared by the Walworth Mfg. Co., Boston, maker of valves, fittings and tools for steam, water, gas, oil and air. The book is known as export catalog No. 35 and is intended for distribution only in those countries in which the British standard thread is used. It comprises 400 pages, 6 x 9 in., printed on a yellow tint block to increase legibility, and bound in an attractive gray cloth cover. The arrangement of the languages is such that these appear in the same sequence on each page. The various products are illustrated, the engravings being prominently displayed and brought out in strong relief on the safe presumption that pictures are a universal language. The difficulties of translating the technical terms in many cases have been overcome by giving a translation which keeps the spirit of the engineering terms though the translation from the English is not literal.

The Wyman-Gordon Co., Worcester, Mass., drop forgings, has reduced its capitalization from $4,400,000 to $3,850,000 by cancelling 500 shares of first preferred stock and 5000 of second preferred. George F. Fuller is president and Harry G. Stoddard, treasurer.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Sept.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
29	18.50	18.50	43.00	7.75	7.50	7.65	7.65
30	18.50	18.50	42.50	7.75	7.50	7.65	7.65
Oct.							
1	18.50	18.50	43.00	7.50	7.50	7.65	7.60
2	18.37½	18.37½	....	7.50	7.50	7.65	7.60
4	18.25	18.25	43.00	7.50	7.50	7.65	7.50
5	18.25	18.25	42.50	7.50	7.50	7.65	7.50

NEW YORK, Oct. 5.

There is no improvement in the general situation, all the markets being inactive and in some cases lower. There is almost no buying of copper. The tin market is exceedingly quiet. The import situation as to lead and zinc is still a dominant factor with buying on a small scale. Antimony is a little lower.

New York

Copper.—Consumers continue to do almost no buying and are making very few inquiries. The limited demand is evidently being satisfied largely by small producers and dealers whose prices establish what market there is. Sales from this source are being made around 18.25c., New York, for both Lake and electrolytic, which we quote as the market, although with such limited sales there has been no real test. Most of the consumers quote both grades of copper, if they quote at all, around 18.50c., New York. A small amount of foreign buying is reported. There are also evidences that production is being curtailed in many quarters. It cannot be said that pessimism rules and the opinion has been expressed that at the end of six weeks a decided improvement for the better will exist.

Copper Averages.—The average price for both Lake and electrolytic copper for the month of September, based on the daily quotations in THE IRON AGE, was 18.70c., New York.

Tin.—Up until yesterday the market had been almost at a standstill, although prices were at an attractive level. Consumers, however, have shown no interest and are still out of the market with some offering the metal for sale. Hesitation and caution are generally manifested, with more sellers than buyers. Yesterday, however, there was a little more interest on the part of dealers who were buyers of small amounts and who seem ready to pick up bargain lots, particularly for Eastern shipment. Yesterday on the New York Metal Exchange 50 tons of October-November shipment was sold at 42.75c., and more could have been sold had it been available. Spot tin was reported offered at 42.50c. Sellers appeared reluctant to quote after these developments. The market as a whole is very quiet. Spot straits tin to-day is quoted at 42.50c., New York, with the London market at £272 per ton. The London quotation for spot standard to-day was £270 and future standard £275. Deliveries of tin into consumption for September were 4860 tons, with stocks and landing on September 30 at 3731 tons. Imports to Oct. 1 have been 42,023 tons, as compared with 16,976 tons to Oct. 1, 1919. Arrivals thus far this month have been 1000 tons with the quantity afloat 2285 tons.

Lead.—The American Smelting & Refining Co. again made a reduction of ¼c. per lb., Sept. 29, making the total 1¼c. per lb. since Sept. 13, and bringing the quotation to 7.50c., St. Louis, or 7.75c., New York. Imported lead continues to be the leading factor, but demand is exceedingly light and consumers do not appear anxious to buy. The market may be quoted at 7.50c., St. Louis, and 7.50c., New York, the latter being based upon the offerings of imported metal.

Zinc.—Prime Western zinc sold in England and reshipped to this country is still available at seaboard at about 7.65c., and the domestic product is quoted, by one interest at least, at 7.50c., St. Louis. Both of these quotations are lower than a week ago. There is very little buying by consumers or dealers, and producers are unwilling sellers except to regular customers. We quote the market for domestic prime Western at 7.50c., St. Louis, or 7.90c., New York, with the New York market for imported metal at 7.65c., New York or seaboard.

Antimony.—The market continues quiet, with wholesale lots for early delivery available at 7c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, from foreign sources, is quoted at 29c. to 30c., New York, while that of the leading interest is unchanged at 34.90c., f.o.b. producers' mill.

Old Metals.—The market continues depressed with few transactions. Values are generally a little lower. Their selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	17.50
Copper, heavy and wire	16.50
Copper, light and bottoms	14.00
Brass, heavy	12.00
Brass, light	8.75
Heavy machine composition	17.00
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	14.00
Lead, heavy	7.25
Lead, tea	5.00
Zinc	6.00

Chicago

OCT. 5.—The market is quiet throughout and copper, lead and spelter have shown further declines. Buying of tin has been confined to small purchases for immediate requirements. Recession in prices have brought out a small amount of business in lead and spelter. There has been some buying of future antimony and while trading has been by no means brisk, more interest is being manifested in this metal than for some time. Old grades of copper, brass, lead and tin have weakened. We quote Lake copper at 18.75c. to 19c. in carload lots; tin, 46c. to 47c.; lead, 7.75c.; spelter, 7.65c.; antimony, 8.50c. to 9c. On old metal we quote copper wires, crucible shapes, 12c.; copper clips, 12c.; copper bottoms, 10.75c.; red brass, 12c.; yellow brass, 8c.; lead pipe, 5.50c.; zinc, 4c.; pewter, No. 1, 22.50c.; tin foil, 27.50c.; block tin, 30c.; all these being buying prices for less than carload lots.

St. Louis

Oct. 4.—The non-ferrous metal markets have been slow and soft with car-lot quotations closing at 7.50c. for lead and 7.60c. for spelter, and dull at that. In less than car lots the prices quoted were: Lead, 8c.; spelter, 8.25c.; tin, 52c.; copper, 19c., and antimony, 9c. In the Joplin district ores were very soft, with lead quoted, basis 80 per cent, at $80 per ton; zinc blende, basis 60 per cent, $42.50 per ton, and calamine, basis 40 per cent, $32 to $35 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 6c.; heavy yellow brass, 8c.; heavy red brass, 12c.; heavy copper and copper wire, 12.50c.; light copper, 12c.; pewter, 24c.; tinfoil, 35c.; zinc, 4c.; lead, 6c.; tea lead, 3c.; aluminum, 19c.

Two Vom Baur Electric Furnaces Sold

Sales are announced by C. H. Vom Baur of one 3 to 5-ton Vom Baur electric furnace to the Consolidated Steel & Rolling Mills Co., Mexico City, Mexico, for making steel castings and one 1-ton furnace, basic, to the Rhode Island Crucible Steel Castings Co., Providence, R. I., also for steel castings.

The Bethlehem Steel Corporation practically has abandoned all idea of constructing a modern general warehouse on the ten-acre lot of land in Everett, Mass., purchased several months ago for that purpose. The land is situated in close proximity to the Boston & Maine Railroad.

W. H. J. Fitzgerald & Co., machine tool dealers, Boston, have been appointed exclusive agents for New England with the exception of Connecticut, for the Liberty planer manufactured by the Liberty Machine Tool Co., Hamilton, Ohio.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	0.695
New York	0.38	Omaha	0.815
Boston	0.415	Omaha (pipe)	0.78
Buffalo	0.295	Denver	1.35
Cleveland	0.24	Denver (wire products)	1.415
Cincinnati	0.33	Pacific Coast	1.665
Indianapolis	0.345	Pacific Coast, ship plates	1.335
Chicago	0.38	Birmingham	0.765
St. Louis	0.475	Jacksonville, all rail	0.555
Kansas City	0.815	Jacksonville, rail and water	0.46
Kansas City (pipe)	0.78	New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.45c. to 3.10c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 to $2 and shorter than 1 in., $2 to $2.50. Bright basic wire, $3.25 to $4 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25 to $4.25; No. 8 and heavier, $4 to $4.25; galvanized wire, $3.95 to $4.70; galvanized barbed wire and fence staples, $4.10 to $5.10; painted barbed wire, $4.60; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $4.10; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 55 to 58 per cent off list for carload lots, 54 to 57 per cent for 1000-rod lots, and 53 to 56 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.75 to $5.00 base
Large boiler rivets	4.85 to 5.00 base
Small rivets	40 per cent off list
Small machine bolts, rolled threads	25 and 10 per cent off list
Same sizes in cut threads	25 per cent off list
Longer and larger sizes of machine bolts	25 per cent off list
Carriage bolts, ⅜-in. x 6-in.:	
Smaller and shorter, rolled threads	20 per cent off list
Cut threads	20 per cent off list
Longer and larger sizes	20 per cent off list
Lag bolts	40 per cent off list
Plow bolts No. 1, 2 and 3 head	35 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:	
Smaller and shorter	10 per cent off list
Longer and larger sizes	10 per cent off list
Hot pressed sq. or hex. blank nuts	50c. off list
Tapped nuts	list
C. p. c. & t. sq. or hex. nuts, blank	list plus $1.00
C. p. c. & t. sq. or hex. nuts, tapped	list plus $1.00
Semi-finished hex. nuts, U. S. S. and S. A. E.:	
⅜-in. and larger	40 per cent off list
9-16-in. and smaller	40 per cent off list
Stove bolts in packages	60 and 10 per cent off list
Stove bolts in bulk	60, 10 and 2½ per cent off list
Tire bolts	50 per cent off list
Track bolts	7c. base
Iron cap screws	40 per cent off list
Set screws	40 and 10 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57 to $75; chain rods, $70 to $75; screw stock rods, $75 to $80; rivet and bolt rods and other rods of that character $70 to $75; high carbon rods, $80 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $4 to $4.25 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $4.40 to $5; 5/16-in., $5 to $5.75; track bolts, $7. Boat and barge spikes, $4.40 to $5 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates $2 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.50; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 3.50c. from mill. Common bar iron, 4.75c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛, ¼ and ⅜	47 to 50½	20½ to 24	⅛	15½ to 25½	+1½ to 11½
½	51 to 54½	36½ to 40	¼	19½ to 29½	1½ to 11½
¾ to 3	54 to 57½	41½ to 44	⅜ to 1½	24½ to 34½	8 to 18½

Lap Weld

2	47 to 50½	34½ to 38	2	20½ to 28½	6½ to 14½
2½ to 6	50 to 53½	37½ to 41	2½ to 6	22½ to 30½	9½ to 17½
7 to 12	47 to 50½	33½ to 37	7 to 12	19½ to 27½	6½ to 14½
13 and 14	37½ to 41				
15	35 to 38½				

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43 to 46½	25½ to 29	¼	+17	+50
½	48 to 51½	35½ to 39	⅜	13½ to 23½	6½ to +3½
¾ to 1½	52 to 55½	39½ to 43	½	18½ to 28½	5½ to 15½
2 to 3	53 to 56½	40½ to 44	¾ to 1½	24½ to 34½	9½ to 19½

Lap Weld, extra strong, plain ends

2	45 to 48½	33½ to 37	2	21½ to 29½	8½ to 16½
2½ to 4	48 to 51½	36½ to 40	2½ to 4	23½ to 31½	11½ to 19½
4½ to 6	47 to 50½	35½ to 39	4½ to 6	22½ to 30½	10½ to 18½
7 to 8	43 to 46½	29½ to 33	7 to 8	14½ to 22½	2½ to 10½
9 to 12	38 to 41½	24½ to 28	9 to 12	9½ to 17½	5½ to +2½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ to 1⅞ in.	+ 7 to — 19½	1¾ to 1⅞ in.	+ 20
2 in.	+ 2 to — 19½	2 in.	+ 10 to 15
2¼ to 2½ in.	3 to 30½	2¼ in.	+ 10 to 12
2¾ to 3¼ in.	11 to 30½	2½ in.	+ 1 to 10
3½ to 4 in.	20 to 40½	2¾ to 3¼ in.	— 1½ to + 3
4½ in.	40½	3½ to 4 in.	— 8 to list
		4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills are getting up to the prices quoted in the right-hand column:

Blue Annealed

	Cents per lb.
No. 8 and heavier	3.45 to 5.45
Nos. 9 and 10 (base)	3.55 to 5.50
Nos. 11 and 12	3.60 to 5.55
Nos. 13 and 14	3.65 to 5.60
Nos. 15 and 16	3.75 to 5.70

Box Annealed, One Pass Cold Rolled

Nos. 17 to 21	4.15 to 6.80
Nos. 22 to 24	4.20 to 6.85
Nos. 25 and 26	4.25 to 6.90
No. 27	4.30 to 6.95
No. 28 (base)	4.35 to 7.00
No. 29	4.45 to 7.10
No. 30	4.55 to 7.20

Galvanized Black Sheet Gage

Nos. 10 and 11	4.70 to 7.50
Nos. 12 to 14	4.80 to 7.60
Nos. 15 and 16	4.95 to 7.75
Nos. 17 to 21	5.10 to 7.90
Nos. 22 to 24	5.25 to 8.05
Nos. 25 and 26	5.40 to 8.20
No. 27	5.55 to 8.35
No. 28 (base)	5.70 to 8.50
No. 29	5.95 to 8.75
No. 30	6.20 to 9.00

Tin-Mill Black Plate

Nos. 15 and 16	4.15 to 7.05
Nos. 17 to 21	4.20 to 7.10
Nos. 22 to 24	4.25 to 7.15
Nos. 25 to 27	4.30 to 7.20
No. 28 (base)	4.35 to 7.25
No. 29	4.40 to 7.30
No. 30	4.40 to 7.30
Nos. 30½ and 31	4.45 to 7.35

PERSONAL

D. B. Clark and L. H. Mesker have formed the Clark-Mesker Co. to take over the machine tool department of the Cleveland Milling Machine Co. Mr. Clark, president of the new company, is also general manager of the Cleveland Planer Co. and the Cleveland Machine Tool Co. During the war he was superintendent of the Watervliet Arsenal. Mr. Mesker, vice-president and general manager of the new company, has been with the Motch & Merryweather Machinery Co.; Manning, Maxwell & Moore, Inc., and more recently with Kearney & Trecker, Milwaukee.

James Hartness, past president American Society of Mechanical Engineers, and president Jones & Lamson Machine Co., Springfield, Vt., has been nominated as the Republican candidate for governor of Vermont.

Carl E. Bauer, works manager American Steel Foundries, Hammond, Ind., has resigned. G. H. Austin has been appointed acting works manager.

F. H. Butts, Butts & Ordway Co., Boston, heavy hardware, on Oct. 4 celebrated the fortieth anniversary of his association with the hardware business.

Walter M. Jackson, who for about 12 years represented the Berger Mfg. Co., Canton, Ohio, sheet metal building products, is Boston district manager of the National Pressed Steel Co., Massillon, Ohio.

Huntington Downer has been appointed by the Lackawanna Steel Co. district sales agent in Philadelphia, succeeding William Breeden, who was recently appointed general sales manager and assistant to Vice-President H. H. Barbour, with headquarters in Buffalo. Mr. Downer has been connected with the Lackawanna Steel Co. at Buffalo for nine years, his experience including two years in the mills. For the past five years he has been in charge of sales of bars and semi-finished steel.

C. B. Cole, formerly manager Chicago store, Union Twist Drill Co., has become general sales manager of the W. L. Romaine Machinery Co., Chicago.

O. L. Merkt, for 15 years with Westinghouse, Church, Kerr & Co., New York, has become assistant chief engineer of the American Can Co., with headquarters in New York.

P. W. Rice, with the Chicago office of Niles-Bement-Pond for the past nine years, is spending a few days at the plant of the Greenfield Tap & Die Corporation, Greenfield, Mass., which he is to represent in the Middle West.

W. Y. Sherman, formerly in the purchasing department of the Bethlehem Shipbuilding Corporation, Fore River Works, Quincy, Mass., has joined Thomas Crowther, 19 Pearl Street, Boston, metal working machinery.

R. B. Bennett, formerly with the Standard Steel & Bearing Corporation, Plainville, Conn., has accepted the position of mechanical superintendent of the Canadian General Electric Co.

George S. Haven, manager of the Philadelphia office of Reed-Prentice Co.-Whitcomb-Blaisdell Machine Tool Co.-Becker Milling Machine Co., who has been in temporary quarters at the Walton Hotel, has secured permanent offices at 514 Liberty Building, which will be open for business about Oct. 15.

Clayton O. Smith, formerly sales manager Norton Co., Worcester, Mass., is now treasurer and general manager of the O. S. Walker Co., that city.

William E. Lawrence has become supervisor of the gage department, Standard Steel & Bearing Co.'s division at Plainville, Conn. He was formerly with the Marlin-Rockwell Corporation, New Haven, Conn.

L. E. Summers has become works manager of the Grand Haven, Mich., plant of the Keller Pneumatic Tool Co.

Fred J. Passino, formerly assistant district manager of the New York territory of the Independent Pneumatic Tool Co., Chicago, was recently appointed district manager at Pittsburgh.

Gerardo Immediato has been appointed professor of machine and power plant design at the Polytechnic Institute, Brooklyn, N. Y.

Louis H. Blood has resigned as chief engineer of the Oesterlein Machine Co., Cincinnati, and has opened an office as designing engineer in that city, specializing in standard and special machine tools.

C. W. Bayne has become production manager of the F. C. Austin Machinery Corporation, Muskegon, Mich. He was formerly with the Ford Motor Co. and the Timken-Detroit Axle Co.

Alex Crowe, formerly general superintendent Western Gas Construction Co., Fort Wayne, Ind., has been appointed general superintendent of the Aetna Foundry & Machine Co., Warren, Ohio.

H. W. Goewey has resigned as manager of the sales service department of the Truscon Steel Co., Youngstown, Ohio, to engage in business. George Miller, formerly of the auditing department, has been appointed to succeed him.

H. L. McKenzie has retired as general manager, treasurer and director of the newly organized Louisville Sheet Steel Co., Louisville, Ohio, to engage in other business. He was one of the organizers of the company, with which he has been identified for a year. For six years previously he was general manager of the corrugating plant of the Canton Sheet Steel Co. and directed similar work for 13 years for the Berger Mfg. Co., Canton. He has been succeeded as treasurer by J. W. Lucas, who is also secretary.

F. Percy Clarke, assistant manager, and Isaac Williams, chief engineer of the Cargo Fleet Iron & Steel Works, Middlesbrough, England, arrived in New York last week and will visit steel works at Buffalo, Cleveland, Chicago, Pittsburgh and in eastern Pennsylvania.

Harry C. Graham, president Graham Nut Co., Pittsburgh, was elected a member of the board of directors of the Pennsylvania State Chamber of Commerce at the annual meeting in Harrisburg recently. George S. Davison, president the Allen S. Davison Co., Pittsburgh, also was elected a director and Frank J. Lanahan, president of the Fort Pitt Malleable Iron Co., was re-elected a director of the organization.

H. H. Sutton, Pittsburgh, has been appointed general manager of the Hubbard Pressed Steel Co., Niles, Ohio, succeeding Frederick Maples. N. A. Holmes has also retired as superintendent of the company's plant.

Gilbert M. Tinney has been elected a director of the William B. Pollock Co. at Youngstown, Ohio, filling the vacancy created by the death of C. W. McClure, director and general manager.

Lewis R. Smith was recently elected president of the Matthew Addy Steamship & Commerce Corporation, New York. R. M. Lambert, treasurer of the Matthew Addy Co., has been named senior vice-president of the steamship and commerce corporation.

H. B. Chamberlain has resigned as secretary, Chamber of Commerce, New Britain, Conn., effective Oct. 15, when he will enter the sales department of the Fafnir Bearing Co.

David B. Carson, formerly associated with the Carbon Steel Co. as Pittsburgh district sales agent, has resigned to become Cleveland district manager of sales for the Tacony Steel Co., with offices in the Swetland Building.

Edward Grossman, with the Fairbanks Co. of New York for a number of years and with other supply houses, is now associated with the T. P. Walls Tool & Supply Co., 25 Leonard Street, New York, in the capacity of treasurer and manager.

Ivan E. Marshall has been appointed district manager of the Buffalo office of the Rickert & Shafer Co., machinery and tools, with headquarters at 807 Iroquois Building.

Hewitson Hall, general manager of the iron and steel works at Jarrow-on-Tyne, England, operated by Palmer's Shipbuilding & Iron Co., Ltd., is touring the United States, visiting leading steel plants.

Judge Gary Returns

In fine health and spirits, Judge Elbert H. Gary, chairman of the United States Steel Corporation, returned last Sunday from a sojourn of two and one-half months in Europe. He declined to give any extended interview or statement, saying that he expected to discuss conditions in France and Belgium in the address which he will deliver at the meeting of the American Iron and Steel Institute in New York Oct. 22. As to the steel industry he said:

"From my information I consider the steel industry in a healthy condition, although there has been a noticeable diminution in volume and also a decrease in prices. So far as our corporation is concerned, conditions are perfectly satisfactory."

He said he hoped the prices of steel rails would not be affected to any great extent by the advance in freight rates, and added: "Our policy is to keep prices from going too high or too low."

It is not known whether Judge Gary will make any reply to or comment upon the report of the Interchurch World Movement relating to the steel strike. Although proofs of the report were in the hands of the newspapers before he started for Europe, he was not furnished a copy and the book was not delivered at his office until a number of weeks later. He said yesterday that he had not yet read it.

OBITUARY

E. V. PORTER, who for a number of years had been Pittsburgh district sales representative of the Andrews Steel Co., Newport, Ky., died suddenly at his home in Carrick, Pa., Oct. 2. He was 47 years old and a native of Pittsburgh. His first connection with the steel industry was in the plant of the Carbon Steel Co., of which he was assistant superintendent when he resigned to take up the sales agency for the Andrews Steel Co. He had also represented in Pittsburgh the De Forest Sheet & Tinplate Co., Niles, Ohio, prior to its absorption by the Republic Iron & Steel Co.

JOHN F. KEMP, Quincy, Mass., died Sept. 28 at his home in that city of heart trouble, aged 63 years. He was proprietor of one of the leading machine shops of the South Shore, Massachusetts.

GEORGE GILBERT DAVIS, treasurer Davis & Furber Machine Co., North Andover, Mass., textile machinery, died at his summer home there Sept. 30, aged 76 years, following a prolonged illness.

H. B. KEIPER, president and founder of the Champion Blower & Forge Co., Lancaster, Pa., died Sept. 19.

HENRY B. SMITH, 70 years old, Bay City, Mich., a stockholder and director of the Chevrolet Motor Co., died last week at the home of a son in Chatham, Ont. He was formerly head of the Michigan Pipe Co.

Decreased Production of Iron and Steel

(*Continued from page* 925)

1918. The production of boiler tubes declined from 124,086 tons in 1918 to 90,109 tons in 1919.

The production of cast iron pipe increased from 619,673 in 1918 to 710,081 in 1919.

The production of hammered charcoal iron blooms, billets, etc., declined from 83,087 tons in 1918 to 32,237 tons in 1919.

The production of concrete bars increased from 344,620 tons in 1918 to 419,021 tons in 1919.

One of the notable declines in miscellaneous rolled products was in rolled forging blooms and forging billets, the tonnage being 1,659,118 in 1918 compared with 359,582 in 1919.

The increases, it will be observed, are, as a rule, in the products in which the tonnage is not very large, and among the noteworthy increases in output of minor products is that of bands and cotton ties from 250,767 in 1918 to 352,172 tons in 1919.

Convention of Export Manufacturers

The annual convention of the American Manufacturers Export Association will be held Oct. 14 at the Waldorf-Astoria Hotel, New York. The morning session will be devoted to registration of members and a business session, at which officers for the coming year will be elected and proposed amendments to the constitution considered. The most important of these amendments recommends that the privileges of membership be extended to include banking institutions, steamship and insurance companies and other corporations interested in the development of foreign trade.

At the afternoon session, opening at 2 o'clock, the keynote will be sounded by President W. L. Saunders, chairman of the board, Ingersoll-Rand Co, whose subject will be "to obtain world trade American manufacturers must take a leading part themselves." Among the other speakers of the afternoon will be R. S. McElwee, the new director of the Bureau of Foreign and Domestic Commerce; W. A. Harriman, president, American Shipping & Commerce Corporation, who will speak on shipping conditions; Otto H. Kahn, Kuhn, Loeb & Co., who will speak on taxation; James S. Alexander, president, National Bank of Commerce, whose subject will be banking and its relation to export.

Italian Industrial Situation

That the attitude of the majority of workmen who have seized Italian metal working plants is anything but radical is the impression of Giulio Pontecorvo, consulting engineer, 527 Fifth Avenue, New York, and head of the Milan iron and steel importing house of Pontecorvo, Hauss & Co., who recently returned from a business trip to Italy. He visited several of the plants that were being operated by the workmen. Most of the reports he said, have been greatly exaggerated. The employers were not taken by surprise, realizing that when they attempted a lockout drastic action would probably be taken by the workers.

Previous to the seizure, Mr. Pontecorvo points out, the workmen presented demands for increased wages that were termed ridiculous by the employers. In rejecting them, the employers suggested that if the workers were in real need of more money to live they could work a full twelve months every year instead of about nine months as they had been. The employers further pointed out that the consumption of wine in the metal working districts had greatly increased since the war. Following the rejection of their demands the workers began to reduce production, at the same time living up to the letter of the rules of the plants. This system of sabotage reduced the output of the Fiat works from about 180 automobiles a day to 20 cars and less. It was then that the lockout was threatened and the workers took over the plants.

The whole affair, according to Mr. Pontecorvo was engineered by a minority of about 25 to 30 per cent, coming chiefly from the large plants of the Fiat, Ansaldo, Gnome and other works. In smaller plants, the workmen, who were in closer contact with the managers and owners, opposed such drastic action, but many of them followed the instructions of the confederation of labor, which immediately after the general seizure issued an order that plants employing less than 200 workers need not be taken over.

The belief of the greater number of progressive employers, said Mr. Pontecorvo, is that this experiment was virtually a milestone in Italian industrial progress and that the workers will gradually come to have more and more of a voice in the management of the plants in which they work.

The Norton Co., Worcester, Mass., grinding wheels and grinding machines, held its annual sales conference Sept. 13-18, inclusive. Papers and addresses coming before the conference were devoted largely to technical matters of interest chiefly to the organization. The talk on Past Accomplishments and Future Possibilities, by Charles H. Norton, which contained remarkably clear and interesting analyses of cylindrical grinding problems, was one of the most interesting of the session.

Machinery Markets and News of the Works

PRICES GUARANTEED

Some Machine-Tool Makers Take This Action to Stimulate Business

Little Demand for Tools—One Large Eastern Plant Goes on Four Days a Week Basis

The lull in the machine-tool trade is more marked. Buying is at a minimum, manufacturers of tools are catching up rapidly on their orders, and further curtailment of operations is indicated. One large Eastern plant this week went on a four-day week basis, and is making tools for stock, having caught up with its orders.

While there is no lowering of prices to stimulate buying, efforts are being made by buyers to force reductions. A Detroit automobile manufacturer, for example, endeavored to obtain a concession from a maker of presses, but the latter refused to budge and negotiations were ended. This instance is typical.

Guaranteeing of prices against declines, which became quite general in the early part of 1919, is again in evidence. Some machine tool manufacturers are guaranteeing prices for six months, even when shipment of tools is made immediately. Some purchases have been made on this basis which otherwise might have been deferred.

Railroad buying at Chicago continues, the Santa Fe having placed additional orders within the past week totaling $35,000 to $40,000. The Illinois Central and the Missouri, Kansas & Texas railroads have each purchased six lathes in Cincinnati.

At Cleveland there are a few inquiries, but little buying. The Ford Motor Co., Detroit, is in the market for 15 automatic machines; a Cleveland bolt and nut manufacturer is inquiring for 15 machines, and the American Automobile Axle Co., Cleveland, is in the market for a small list of tools. The General Electric Co., West Lynn, Mass., has purchased tools for its western Massachusetts subsidiary.

New York

NEW YORK, Oct. 5.

The only new feature of the machine-tool market is the growing insistence of the buyer on protection against a reduction in prices. In a number of instances manufacturers of tools are freely giving this assurance, but the period in which the price is "guaranteed" varies from three to six months. In one instance a manufacturer agrees to refund to the buyer a sum equal to any reduction that may be made within the next six months. There are still many machine-tool manufacturers, however, who decline to discuss the possibility of price readjustments within the near future. There is scarcely enough business in prospect in this territory to furnish a real test of what sellers might be willing to do. In the case of one small sale, a 5 per cent discount was granted the buyer.

The Steel Specialties Co. has removed its office and factory from Waltham, Mass., to West Water Street, Wakefield, Mass. Its lock washer, formerly known as the Worth wedge washer, will be sold hereafter as the Hold-Tite nut-lock.

Active inquiry and few sales mark the crane business. A recent inquiry for estimating purposes includes nine overhead traveling cranes. Some buyers evidently expect to obtain better prices by delaying. While no radical reductions in crane quotations are noted, one manufacturer of locomotive cranes, who increased prices about 7½ per cent early in August, has recently made a corresponding reduction. There are some export inquiries for locomotive cranes. The two 10-ton and one 3-ton overhead traveling cranes purchased by the Metal & Thermit Corporation, 120 Broadway, New York, were placed with Manning, Maxwell & Moore, Inc. The 3-ton crane for the same company at Chrome, N. H., has not yet been awarded.

Among recent sales are: Northern Engineering Works, one 65-ton overhead traveling crane to the Phoenix Utilities Corporation, 120 Broadway, New York; Chisholm-Moore Mfg. Co., a 10-ton, 45-ft. span hand power crane to the village of Freeport, L. I., for a new waterworks; Arthur Appleton, 29 Broadway, New York, a 10-ton, 72-ft. span hand power crane to the West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York.

Wessell, Nickel & Gross, 457 West Forty-fifth Street, New York, manufacturer of piano action mechanisms, has awarded a contract to the Flynt Building & Construction Co., Palmer, Mass., for a new three-story plant at Barton, Va.

The Good Mfg. Co., 305 East 134th Street, New York, manufacturer of brass goods, piping and other plumbing supplies, has increased its capital to $260,000.

The Victory X-Ray Corporation, New York, has been formed as a consolidation of the Victor Electric Corporation, 131 East Twenty-third Street, and the X-Ray Supply Co., with active capital of $246,185, to manufacture X-ray and other precision electrical equipment. J. F. Hartz, C. F. Samms and H. S. Blake, 116 West Thirty-second Street, are the incorporators.

Randolph Ember, 11 King Street, Brooklyn, is having plans prepared for a new one-story brick foundry, 56 x 96 ft., on Delevan Street, to cost about $25,000.

Henry Ford & Son, Dearborn, Mich., are having plans prepared by Stone & Webster, engineers, 120 Broadway, New York, for their new plant at Green Island, Troy, N. Y., for the manufacture of tractors. With equipment, including power plant, it will cost close to $2,000,000.

Scott & Williams, 366 Broadway, New York, manufacturers of knitting machinery, have awarded the general contract for their proposed two-story and basement machine shop at Archer and Middletown streets, Jamaica, L. I., to John Thatcher & Son, 60 Park Avenue, Brooklyn.

Alexander Mayer & Co., Inc., New York, has been incorporated with a capital of $50,000 by T. E. and F. Behr and J. C. Rosa, 165 Broadway, to manufacture iron and steel products.

Fred K. Blanchard, Inc., Troy, N. Y., has been incorporated with a capital of $80,000 by C. C. Lathrop, M. Lance and Fred K. Blanchard, to manufacture grinding wheels and other abrasive products.

Construction has commenced on a new five-story automobile service and parts plant on South Jane Street, extending from Ely to William Street, Long Island City, estimated to cost about $500,000. It will be occupied under lease by the automobile branch of the Standard Steel Car Co., 1920 Broadway, New York, with headquarters at Pittsburgh.

The Engineering Department of the Transit Construction Commission, 49 Lafayette Street, New York, has had plans prepared for new car and repair shops at Lenox Avenue and 148th Street. The building contract will soon be awarded.

The Plattsburg Body Corporation, Plattsburg, N. Y., has been incorporated with a capital of $50,000 by J. B. Todd, P. A. and J. W. Guibord, to manufacture automobile bodies.

The Ideal Gas & Electric Fixture Co., 433 Broadway, New York, manufacturer of brass and other metal electric and gas fixtures, has increased its capital from $10,000 to $70,000.

The Penn Seaboard Steel Corporation, 111 Broadway, New York, has filed notice of increase in capital to $1,750,000.

The National Conduit & Cable Co., Hastings-on-Hudson, N. Y., has discontinued temporarily operations at its brass tube plant. Reports that the company is planning to dispose of this branch of its business have been denied. It is said that as soon as the demand improves operations will be resumed.

The Standard Wire Tire Corporation, New York, has been

incorporated with a capital of $100,000 by B. J. Bowers, A. L. Chauvet and S. S. Shears, 221 Hancock Street, Brooklyn, to manufacture tire and rubber goods.

Fraser, Brace & Co., 1328 Broadway, New York, has filed plans for the erection of a one-story shop, 27 x 52 ft. and 22 x 31 ft., at its shipyard, Edgewater Avenue, Clifton, S. I., for brass and copper working.

The General Electric Co., Schenectady, N. Y., has acquired a large interest in the Locke Insulator Co., Victor, N. Y. The Locke company is building a plant at Baltimore, Md., which is expected to be ready for occupancy at an early date. The Symington-Hoffman Co., Baltimore, recently acquired control of this company and will be prominently identified with it under the new arrangement.

The American Foundry Equipment Co., 366 Madison Avenue, New York, and the Whiting Foundry Co., Harvey, Ill., manufacturers of sand blast machinery and general foundry apparatus, have been merged under the name of the Whiting Corporation. Headquarters will be at Harvey.

The Green-Matthews-Taylor Co., 42 Broadway, New York, manufacturer of elevator and cement machinery with plant at 960 Home Avenue, has acquired property in the vicinity of its works, 74 x 75 ft., for extensions.

The Aeolian Co., Aeolian Hall, Forty-second Street, New York, manufacturer of player-pianos, player actions, talking machines, parts, etc., has acquired the five-story reinforced-concrete factory, 100 x 225 ft., at Willow Avenue and 138th Street, for a new plant.

James H. Rhodes & Co., 115 Fulton Street, New York, manufacturers of abrasives, polishing materials, etc., have acquired about one acre in the Degnon Terminal district, Long Island City, for the erection of a new plant to cost about $200,000, including equipment.

The control of the Curtiss Aeroplane & Motor Corporation, Garden City, L. I., has been acquired by C. M. Keys, vice-president and chairman of the financial committee, from the Willys-Overland Co. and John N. Willys interests. No reorganization is contemplated at this time, and Glenn H. Curtiss will continue as head of the engineering division of the company. It is reported that the works may be moved to Hammondsport, N. Y., the original site of the Curtiss company.

E. I. du Pont de Nemours & Co., Wilmington, Del., have completed plans for a new steam-operated power plant in the vicinity of Pine Grove, N. J., to cost about $350,000, including equipment. The du Pont Engineering Co., du Pont Building, Wilmington, is in charge.

The Lyons Electric Appliance Co., Bridgeton, N. J., has been incorporated with a capital of $100,000 by John P. Lyons, R. Elmer Shoemaker and Frank R. Bacon, to manufacture electrical appliances and equipment.

The Michelin Tire Co., Milltown, N. J., has awarded a contract to the John W. Ferguson Co., United Bank Building, Paterson, N. J., for a two-story reinforced-concrete building, 60 x 125 ft.

The Multi Rubber Co., Flemington, N. J., has been incorporated with a capital of $50,000 by Dennis S. Hall, William Ehrenfeld and Samuel F. Case, to manufacture rubber products.

The Prentiss Tool Co., 439 Communipaw Avenue, Jersey City, N. J., has filed plans for a one-story extension.

In connection with the proposed improvement program of the Delaware, Lackawanna & Western Railroad, Hoboken, N. J., will be the installation of an electric-operated traveling crane at the Ferry Street yards.

The Ewing Rubber Co., Hillcrest, N. J., has been incorporated with a capital of $100,000 by Archibald F. Updike, A. Conrick and James Schultz, to manufacture rubber products.

The Shur-Loc Elevator Safety Co., 127 White Street, New York, manufacturer of locking and safety devices, has leased a four-story brick building, 50 x 150 ft., 420-24 Ogden Street, Newark, N. J., for a new plant. Equipment will be installed for about 150 operatives.

The Rickey Machine & Garage Co., 156-58 Main Street, East Orange, N. J., has acquired 58 x 208 ft. adjoining its works and has plans under way for a two-story addition.

The complete plant of the Hewes & Phillips Iron Works, Verona and orange streets, Newark, N. J., formerly devoted to the manufacture of engines, machinery, etc., will be offered at public auction on Oct. 11-12. The equipment consists of about 300 standard tools, including planers, boring mills, engine lathes, shapers, pipe machines, steam hammer, hydraulic presses, keyseaters, etc.; 30 derrick cranes, with an 8-ton locomotive crane, portable air and electric drills, chain hoists, blacksmithing tools, patternmakers' equipment, etc. A quantity of raw materials will also be disposed of.

The Barlow Foundry, Inc., 551 New Jersey Railroad Avenue, Newark, manufacturer of grey iron castings, has filed plans for a one-story building, 20 x 86 ft.

The Fernando C. Mesa Co., Newark, has been incorporated with a capital of $1,500,000 to manufacture electrical wiring devices and equipment. It is headed by F. C. Mesa of the concern of this name with plant on Chancellor Avenue, in the Waverly section, for the manufacture of ammunition. It is understood that the new business will be conducted from this location. Other incorporators are Roy J. Harding, James Mango and Joseph Price.

The Eastern Electrical Supply Co., 798 Broad Street, Newark, has acquired the three-story and basement building, 47 x 90 ft., at 88-90 Academy Street, for the establishment of a new works.

The Kelsey Motor Co., 25 Branford Place, Newark, recently organized with a capital of $2,000,000, will operate a local plant for the manufacture of the Kelsey friction drive automobile. A factory for initial production has been secured. The company is headed by Ernest B. Slade, head of the Beaver Machine & Tool Co., and the American Foundry Co., both of Newark, as president; M. F. Howland, president Luthy Storage Battery Co., Newark, vice-president, and C. W. Kelsey, former sales manager Maxwell-Briscoe Motor Co., secretary and general manager.

New England

BOSTON, Oct. 4.

Aside from purchases of machine tools by the General Electric Co., West Lynn, Mass., for its western Massachusetts subsidiary, the local market the past week has been almost at a standstill. General Electric purchases include three 16-in. x 6-ft., eight 18-in. x 6-ft., and one 20-in. x 10-ft. lathes, all with taper attachments; eight bench lathes; seven plain, one universal and one vertical milling machines; four die sinking machines; two 20-in. and four 16-in. shapers; one 6-in. and one 10-in. stroke vertical shapers; 10 single-spindle drills, and 10 30-in. drills; two high-speed drills; four universal, eight surface and three tool grinders, and a few small tools. It is intimated that the company is out of the market for additional equipment. The Fales & Jenks Machine Co., Pawtucket, R. I., has purchased two Porter Cable lathes, and the Bassett Machine Works, East Milton, Mass., four used lathes of the same make. The Kingsbury Mfg. Co., Keene, N. H., iron and steel toys, is negotiating for a 24-in. sliding head upright drill. It is installing a Jones & Lamson Hartness flat turret lathe for chuck and bar work and adding other production equipment. Small tools show some activity and there is a fair inquiry for parts.

In a few instances quotations are being shaded on lathes, gas furnaces and other equipment where competition for business is keen, but in general prices are firmly maintained. No cancellations from New England machine-tool users are reported, but they are coming in from other sections of the country. In fact, some makers are receiving cancellations in sufficient numbers to offset new orders. Most manufacturers, however, have enough business to operate from one to three months. The general impression is that another buying movement will begin after the Presidential election. There are several fair sized prospects open and indications are that a number of other industries expect to purchase machine shop equipment between now and Jan. 1.

The Cone Automatic Machine Co., Inc., Windsor, Vt., is completing an addition to its plant and installing one 5-ton crane.

The Windsor Foundry Co., Windsor, Vt., has decided not to build this year the additions contemplated, and is not in the market for two 5-ton cranes.

Plans for a two-story machine shop, 50 x 125 ft., to be erected by the city of Hartford, Conn., on John Street, will soon be ready.

Contract for a small addition to the plant of the South Norwalk Electric Works, South Norwalk, Conn., has been let. One 5-ton crane will be installed.

The Easthampton Foundry, Easthampton, Mass., will move to Florence, Mass., this fall, occupying the plant of the Northampton Iron Works. The latter company will move into the foundry of the former Florence Sewing Machine Co. Ernest A. Moeckel is proprietor of the Easthampton Foundry.

The S. A. Smith Mfg. Co., Brattleboro, Vt., woodenware, toys, etc., has been purchased by interests who have incorporated in Massachusetts under the same name with a capital of $510,000 and the following officers: Arthur B. Clapp, president; C. E. Skerry, vice-president and general manager; Charles A. Boyden, treasurer, and A. M. Hamilton, assistant treasurer, all of Brattleboro. The board of directors includes Frederick H. Payne, president Greenfield Tap & Die Corporation, Greenfield, Mass., and Charles N. Stoddard, also of Greenfield. Frank L. Hunt, Brattleboro, will continue as office manager. Plans call for doubling the capacity of the plant within the next year, a two-story, 24 x 100 ft. addition having been started.

The Eastern Malleable Iron Co., Naugatuck, Conn., manufacturer of castings etc., has completed plans for an addition to its branch plant at Union City, Conn., to cost about $50,000, including improvements in the present works.

The proposed new car construction and repair shops to

be erected by the Boston Elevated Railway Co., 108 Massachusetts Avenue, Boston, at Everett, Mass., are estimated to cost about $2,000,000, including equipment. Plans are being prepared by Dwight P. Robinson & Co., engineers, 61 Broadway, New York.

The Specialty Hardware Mfg. Co., Newport, R. I., has been incorporated with a capital of $50,000 by Charles A. Jenkinson, 41 Hamlin Street, Providence; William A. Manson and William T. Sherman.

The Jewell Belting Co., Hartford, Conn., has arranged for a preferred stock issue of $500,000. It is completing a new plant at West Hartford, at which operations will begin at an early date. The stock issue will be used for general expansion.

The Arrow Electric Co., Hawthorne Street, Hartford, Conn., manufacturer of electric switches, etc., is having plans drawn by Buck & Sheldon, Inc., engineers, 60 Prospect Street, for a three-story addition on Prospect Street.

Prosper M. Bedard, Jr., Adams, Mass., operating a machine shop at 49 North Summer Street, has removed to a building on Spring Street for increased facilities.

The American Wringer Co., Social Street, Woonsocket, R. I., has awarded a contract for a two-story addition, 65 x 180 ft., to P. J. Donaghey, 21 Bell Street, estimated to cost $100,000.

The Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, is having plans prepared for a new four-story building, 75 x 200 ft., to cost about $150,000. J. D. Leland, 185 Devonshire Street, Boston, is architect.

The Kelley & Trefry Body Co., West Roxbury, Mass., has filed notice of organization to manufacture automobile bodies. John F. Kelley and Harry G. Trefry, 29 Corey Street, head the company.

The Waterbury Metal Mfg. Co., Waterbury, Conn., has been incorporated with a capital of $25 000 by A. R., F. H. and Hans Rasmussen, and G. S. Stevens, all of Waterbury, to manufacture iron and metal products.

The Nelson-Nordell Machine Works, Worcester, Mass., has removed its plant from 69 Water Street to 42 Southbridge Street, where increased facilities are provided.

A five-story automobile service building and machine repair works to cost about $500,000 will be erected at Dwight, East Court and New streets, Springfield, Mass., by the National Automobile Parking Co., 145 State Street. Plans will be prepared at an early date. O. P. Thompson is president.

Philadelphia

PHILADELPHIA, Oct. 4.

The Sharpsville Boiler Works, Sixth Street, Sharpsville, Pa., manufacturer of boilers, structural shapes, etc., is completing plans for an addition to its plant.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, has awarded a contract to the Austin Co., Philadelphia, for a one-story foundry at Hatboro, Pa., 100 x 150 ft., for the manufacture of stove castings.

The Waynesboro Wrought Iron Nipple Works, Waynesboro, Pa., recently organized, has arranged for the construction of a plant, 35 x 70 ft., for the manufacture of nipples and other iron pipe fittings. Englar & Albert, operating a local heating equipment business, control the company.

The addition to be erected at the plant of the Gray Iron Foundry Co., Reading, Pa., will be one-story, 60 x 360 ft., and will be used for the manufacture of machinery for concrete work. It is estimated to cost $40,000. Plans have been filed.

The Westinghouse Electric & Mfg. Co., Essington, Pa., has filed plans for a new one-story foundry, 160 x 200 ft., to cost about $45,000. The Austin Co., Philadelphia, is contractor.

Reiff & Nestor, Lykens, Pa., manufacturers of machine tools, have increased their capital to $180,000.

The McCormick Motor Car Co., Williamsport, Pa., has plans under way for a four-story service and repair building, 100 x 196 ft., at Hepburn and Third streets, to cost about $250,000.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris streets, Philadelphia, has filed plans for a two-story addition to its power plant, 60 x 120 ft.

The Philadelphia District Ordnance Salvage Board, 1710 Market Street, Philadelphia, is taking bids up to Oct. 19 for the purchase of the Government property at Belcoville, near Atlantic City, N. J., consisting of about 1000 acres with 84 buildings, varying from 40 x 120 ft. to 40 x 80 ft. and smaller.

The Daniels Motor Co., Reading, Pa., has awarded a contract to the William Steele & Sons Co., Sixteenth and Arch streets, Philadelphia, for the erection of three buildings at Westmoreland and Hunting Park Avenue, Philadelphia. Two structures will be two stories, 80 x 475 ft. and 40 x 100 ft., respectively, and the other one-story, 80 x 475 ft.

Edward L. Hand & Co., Philadelphia, steel products, have removed from 722 Arch Street to 521 Arch Street, where they have increased facilities.

The Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has awarded contract to William Steele & Sons Co., Philadelphia, for another factory building at its new plant on Rising Sun Avenue, to cost $100,000.

A power plant will be constructed by the New Jersey Tile Co., Muirheid Avenue, Trenton, N. J., in connection with extensions to cost about $50,000.

The Gasser Mfg. Co., Trenton, N. J., has been incorporated with a capital of $500,000 by Joseph Gasser, 402 Greenwood Avenue; K. Lougherty and I. Probasco to manufacture machinery and parts.

The Keystone Auto Top Co., 1412 Fairmount Avenue, Philadelphia, has plans under way for a new four-story, brick and reinforced-concrete plant, 85 x 140 ft. LeRoy B. Rothschild, 1225 Sansom Street, is architect.

The Crescent Insulated Wire & Cable Co., Olden and Taylor streets, Trenton, N. J., is completing plans for a new power house, 65 x 100 ft.

The Scotia Brass Works, Conshohocken, Pa., a new local industry, will operate a plant for the manufacture of brass, aluminum and other metal castings. James Inglis heads the company; Chris Seegar, formerly superintendent of the Albion Foundry Co., Conshohocken, will act in the same capacity at the new plant.

The Bethlehem Steel Co., Bethlehem, Pa., has awarded a contract to the Austin Co., Cleveland, for new machine and locomotive shops, 110 x 160 ft., at Lebanon, Pa., to cost about $135,000, and to be supplemented by a power house. The equipment will include a 30-ton traveling crane and 200-ton hoist.

The Bath Portland Cement Co., Bath, Pa., will make enlargements in its power house to cost about $200,000, with equipment. A system will be installed for the utilization of waste heat from the kilns.

The Simmons Hardware Co., 425 Arch Street, Philadelphia, has leased the factory on Master Street, near Thirteenth Street, formerly occupied by the Walters Milling Co., for a term of years.

The Tioga Iron & Steel Co., Fifty-second Street and Grays Avenue, Philadelphia, is planning for the installation of new equipment.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has arranged for a preferred stock issue of $6,000,000. The entire proceeds will be used for extension to its power plants and systems and the completion of the new generating plant at Beach and Palmer streets, now in course of erection. Joseph B. McCall is president.

Buffalo

BUFFALO, Oct. 4.

The American Car & Foundry Co., 370 Babcock Street, Buffalo, has filed plans for a two-story addition, 46 x 75 ft., to cost about $40,000.

Louis J. Sigl, Buffalo, has made application to the City Council to operate an automobile service and repair works at 3110 Main Street. A machine shop with electrical repair department will be operated.

The Buffalo Foundry & Machine Co., 1543 Fillmore Avenue, Buffalo, has awarded a contract to the Charles Berrick's Sons Co., 1151 Main Street, for a two-story addition, 50 x 70 ft., to cost about $25,000.

The Dunlop Tire & Rubber Corporation, River Road, Buffalo, has arranged for the erection of an addition to its cord fabric plant at Utica, N. Y., to cost about $80,000. It is understood that further additions will be made at a later date, with an available fund of $2,500,000 to be used at Utica out of an appropriation of $20 000,000 for the Buffalo plant, now in course of erection. The parent company, the Dunlop Rubber Co., Ltd., London, England, has recently trebled its capital, now approximating $100,000,000. Perry D. Saylor is vice-president and general manager of the organization in the United States.

The Batavia Car Works, Batavia, N. Y., has been incorporated with a capital of $350,000 by A. J. Waterman, J. Baukat and R. M. Walker, to manufacture locomotives, railroad trucks and cars.

The Rustless Rule Co., 9 East Lafayette Street, Buffalo, is having plans prepared for a one-story and basement addition, 20 x 65 ft., to cost about $12,000.

The Electro-Refractories Corporation, Buffalo, has increased its capital from $200,000 to $550,000.

The Metal Arts Co., Rochester, N. Y., has increased its capital from $25,000 to $150,000.

The Rochester Castings Corporation, Rochester, is having plans prepared for a new one-story, brick and steel foundry, 275 x 1000 ft. J. F. Ancona, Cutler Building, is architect.

The Commercial Machine Co., Westfield, N. Y., manufacturer of machinery and parts, shafting, etc., has been reorganized with active capitalization of $53,750 and $500,000 in preferred stock.

The Air-Felt Shoe Polishing Machine Corporation, Syracuse, N. Y., has been incorporated with a capital of $500,000 by A. E. and E. C. Enise and J. C. Sanborn, 237 Oakwood Avenue, to manufacture special machinery. A previously operated company, known as the Air-Felt Shoe Polishing Corporation, Utica, N. Y., has filed notice of dissolution.

The Board of Contract and Supply, Board of Education, Syracuse, N. Y., has a list of machine shop equipment to be installed in the industrial department at the continuation school. It is understood that bids will be received at once.

E. R. Caldwell & Son, 619 West Fayette Street, Syracuse, N. Y., manufacturers of iron castings, etc., have awarded a contract to the Shane Construction Co., Herald Building, for the erection of a one-story foundry addition, 50 x 60 ft., to cost about $10,000.

The Hotchkiss Steel Products Co., Binghamton, N. Y., has been incorporated with a capital of $200,000 by William Roe, M. S. and M. R. Hotchkiss, to manufacture iron and steel specialties.

The Griffin Mfg. Co., Erie, Pa., manufacturer of cold rolled strip steel and hardware, is erecting a three-story and basement brick and steel addition, 40 x 165 ft., to its office and shipping rooms.

The Buffalo Foundry & Machine Co., Buffalo, will build a two-story brick addition to its pattern shop at 1543 Fillmore Avenue, at a cost of $15,000.

Pittsburgh

PITTSBURGH, Oct. 4.

Although a fair amount of inquiry is developing in the local machinery market, actual business remains extremely light. The fact that buyers are evincing interest lends some encouragement, but at the same time there is no disposition to regard it as positive assurance that business will result immediately. On the contrary, it is realized that the general recession in commodity prices has not yet corrected the credit situation and until there is marked improvement in that direction it is not believed that much buying will ensue. Improvement in transportation conditions is marked, but collections against shipments have been rather slow. The appearance of more inquiries is the only reflection of the somewhat more comfortable position in which the manufacturers now find themselves. Some urgent requirements exist, but are not being placed because buyers want to see how far price adjustments will go, while the Presidential election is used by some as a reason for holding back. In the case of a recent inquiry for four cranes, the placing of the order is held up by the reopening of the Pittsburgh basing point case. Although cancellations of machine tools, incident to the slump in the automobile industry, have been heavy, only in a few instances are makers promising much better deliveries. Business backed up badly as a result of the recent transportation and labor troubles, and only those depending to a large extent upon the automobile and allied industries now need orders to keep going full.

The D. P. Dumi Structural Steel Co., 501 Standard Life Building, Pittsburgh, has plans under way for a one-story steel fabricating plant, 75 x 150 ft., at Hoboken, Pa.

The Clinton Iron & Steel Co., Pittsburgh, has filed plans for a one-story building on West Carson Street, Southside, to cost about $20,000.

The P. H. Murphy Co., New Kensington, Pa., manufacturer of railroad equipment and supplies, has completed revised plans for its new foundry, 73 x 700 ft., at Plumb Creek, Pa. J. T. Desmond is general manager.

Dwight E. Hamlin, Carl Cappel, Jr., and A. L. Petty, 1156 Frick Annex, Pittsburgh, have organized the Diamond Tank Car Corporation, to manufacture car trucks, operate a tank car repair works, and engage in other general construction and operations.

The United States Chain & Forging Co., Pittsburgh, is planning for extensions and improvements at its plants at Huntington, W. Va., and Marietta, Ohio. It will discontinue certain features of manufacture at its McKees Rocks works, and equipment will be removed to the other two plants. Frank A. Bond is general manager.

The Union Electric & Machine Co., Charleston, W. Va., has increased its capital to $50,000.

The Pittsburgh Screw & Bolt Co., Preble Avenue, Pittsburgh, manufacturer of screws, bolts, rivets, etc., has filed plans for a one-story addition to cost about $15,000.

The American Foundry & Construction Co., 4700-4732 Second Avenue, Pittsburgh, has taken out a permit for a one-story brick addition.

The Follansbee Brothers Co., Pittsburgh, manufacturer of iron and steel products, has completed plans for extensions and improvements in its building at Third and Liberty avenues, to cost about $55,000.

The Keystone Motors Co., Lewistown, Pa., is taking bids for a new two-story service and repair building, 180 x 200 ft., to cost about $100,000.

Victor D. Younkins, Robert P. Dickinson and A. C. Teplitz, 720 Frick Building, Pittsburgh, have organized the Automotive Service & Mfg. Co., to manufacture automotive machinery, parts and other appliances. Application has been made for a State charter.

Hubbard & Co., 6301 Butler Street, Pittsburgh, manufacturer of bolts, nuts, rivets, etc., have filed plans for a one-story addition.

Chicago

CHICAGO, Oct. 4.

The Santa Fe continues to buy against its outstanding lists, its purchases the past week being for between $35,000 and $40,000 worth of machine tools. The Illinois Central, Pere Marquette and Chicago & Northwestern have failed to take action on inquiries now before the local trade. On the whole the market continues quiet, although recent railroad buying and occasional industrial orders have brought up the total September sales of a few machinery houses to a fairly good figure. Deliveries from manufacturers are steadily improving and prices remain unchanged.

The Elgin Motor Car Corporation, Argo, Ill., has purchased four acres adjoining its plant at Sixty-first Street and Ogden Avenue, and contemplates the erection of a two-story factory, warehouse and service station, 160 x400 ft.

The Hannifin Mfg. Co., manufacturer of air chucks, 621 South Kolmar Avenue, Chicago, has purchased a tract, 213 x 252 ft., on the northeast corner of Wellington and Knox avenues, and is having plans drawn for a $200,000 plant.

The Hadomac Construction Co., 111 West Washington Street, Chicago, has let contracts for a nine-story foundry and machine shop, 48 x 100 ft., at 1748-50 Carroll Avenue to cost $20,000.

F. Norwood Wilson, 331 West Thirty-fifth Street, Chicago, has let contracts for a structural steel shop, 75 x 105 ft., at 3149 Shields Avenue to cost $29,000.

The Star Brass Works, 3120 Carroll Avenue, has let contract for a one and two-story factory, 47 x 159 ft., at 3124-26 Carroll Avenue, to cost $11,000.

The Frances Nygre Foundry Co., 2542 Fillmore Street, Chicago, has let contract for a one-story extension, 20 x 37 ft., to cost $4,000.

The Steel Fabricating Corporation, Harvey, Ill., will remove its plant to Michigan City, Ind., having purchased a 40-acre site near the Lake front where it will have its own dock.

The Dice Machine Co., Anderson, Ind., will double its capacity at a cost of $50,000. The new structure will be 100 x 125 ft.

The Allerton Foundry Co., Niles, Mich., which recently purchased the former plant of the Tate Mfg. Co., is building an addition, 60 x 60 ft. The Allerton company was recently organized with $50,000 capital stock.

The East St. Louis Locomotive & Car Co., East St. Louis, Ill., with a capital stock of $5,000,000, has obtained options on three local sites and will erect a plant in the near future to build and repair cars and locomotives. Robert W. Crawford, formerly of Chicago, is president of the company.

P. H. Brutger has purchased the interest of his partner in the Litchfield Machine Shop, Litchfield, Minn.

The General Stamping & Mfg. Co., 2225 West Chicago Avenue, Chicago, has completed plans for a new one-story machine shop, 45 x 75 ft.

The American Car & Foundry Co., Madison, Ill., has awarded a contract to the Wimmer Construction Co., Victoria Building, St. Louis, for a new one-story spring works, 72 x 161 ft., to cost about $50,000.

The Southern Gem Coal Co., 37 West Van Buren Street, Chicago, is completing plans for a new coal washing and handling plant at its works at Pinkneyville, Ill., to cost about $100,000.

The Denver Rock Drill Co., Thirty-sixth and Gilpin streets, Denver, Col., manufacturer of mining equipment, has filed plans for a new three-story plant, 75 x 125 ft., to cost about $100,000.

Baltimore

BALTIMORE, Oct. 4.

The General Elevator Co., 428 East Saratoga Street, Baltimore, manufacturer of elevators, parts and operating mechanisms, is planning for extensions and improvements in its plant at Charles and Conway streets, to cost about $20,000.

The American Can Co., 120 Broadway, New York, has taken bids for its four-story reinforced-concrete plant at Hudson and Boston streets, Baltimore, estimated to cost about $500,000 with equipment.

The Hagerstown Foundry Co., Hagerstown, Md., manufacturer of iron and steel castings, has perfected plans for a two-story machine shop, 60 x 90 ft., on West Lea Street, to cost about $12,000.

The Red "C" Oil Mfg. Co., Keyser Building, Baltimore, with plant at Highlandtown, is planning for the erection of a new refinery in the Locust Point district. It has secured options on the Torsch property, near the Key Highway, and negotiations for purchase are under way.

The Druid Oak Belting Co., 111 East Lombard Street, Baltimore, has increased its capital to $250,000.

A one-story power plant, 110 x 130 ft., will be constructed by the American Sugar Refining Co., 117 Wall Street, New York, in connection with its new plant near Baltimore.

The Aircraft Products Co., Elkton, Md., has been incorporated with a capital of $25,000 by J. H. Cassidy, A. L. Abrahams and E. V. Borden, Elton, to manufacture flying machinery and appliances, parts, etc.

The Merchants & Miners Transportation Co., Light and Redwood streets, Baltimore, will establish a new machine repair plant at its pier No. 3, Pratt Street. Considerable equipment now installed in similar works on South Gay Street will be utilized.

The Construction Quartermaster, United States Government, Aberdeen, Md., has completed plans for a new airplane station at the local arsenal, to include shop and construction facilities and to cost about $150,000.

The National Adjustable Bed & Spring Co., 511 Orange Street, Wilmington, Del., manufacturer of metal beds, springs, etc., has completed plans for a new one-story plant at Elsmere, Del., 42 x 115 ft., to cost about $25,000.

The Newport Shipbuilding Corporation, Newbern, N. C., has leased the former shipyard of the Liberty Shipbuilding Co., Wilmington, N. C., recently taken over by the city. It plans for immediate operations and will engage a force of about 500.

The Marine Iron Works Co., Berkley, Va., is completing plans for a two-story machine shop, 60 x 175 ft., to cost about $75,000. B. F. Mitchell, Seaboard Building, is architect.

The Board of Education, Baltimore, has awarded contract for a one-story brick addition to the vocational school to Fred Decker & Son, 1209 East Biddle Street, Baltimore. It will cost $21,000.

The Baltimore Malleable Iron & Steel Casting Co., Charles and Wells streets, Baltimore, has awarded contract to Franie Brothers & Haigley, 18 Clay Street, for an addition to its foundry.

The James J. Lacy Co., Block and Wills streets, Baltimore, iron founders, has awarded contract for a foundry addition to R. B. Mason, 308 West Madison Street, Baltimore, at a cost of $14,000.

Plans of the National Bituminous Enamel & Paint Corporation, Key Highway and Lawrence Street, Baltimore, provide for the construction of two buildings, eight stories, 50 x 150 ft. and three stories 50 x 75 ft. Machinery will be installed. J. R. Broderick is president.

The machine and pattern shops of the Tredegar Co., Richmond, Va., recently damaged by fire with an estimated loss of $200,000, will be rebuilt.

Cleveland

CLEVELAND, Oct. 4.

Following the same policy adopted with steel purchases, Detroit automobile companies are attempting to force down prices of machine tools. One leading motor car maker received quotations a few days ago for a number of presses, but declined to place the order at the prices given. The manufacturer, however, refused to lower his quotations and negotiations were discontinued. Sellers are watching the market closely, as they expect that with the limited volume of business and the need for orders some price concessions will come out, but so far none is reported. Another feature of the market is the request by some prospective buyers that they be guaranteed against price declines. Guarantees of this kind, mostly for six months, were given early in 1919 during the dull period following the war. So far, machine-tool builders have apparently not decided what policy they will adopt in this matter.

The market continues dull, but some dealers report a little improvement in the volume of inquiry. Not much of this, however, has developed into orders. A Cleveland bolt and nut manufacturer is inquiring for about 15 machines and the Ford Motor Co. is inquiring for 15 automatic machines. The American Automobile Axle Co., Cleveland, is taking quotations on some equipment. A Lake vessel interest is figuring on several machines for ship repair work and the Russ Twist Drill Co. is purchasing equipment for a plant recently built in Madison, Ohio.

The Cleveland Folding Bed Co., which is enlarging its plant, has acquired three buildings, providing 15,000 sq. ft. of floor space for the manufacture of springs. Some additional equipment will be purchased.

The Clay Engine Mfg. Co., 864 East Seventy-second Street, Cleveland, is planning the erection of a one-story factory at an estimated cost of $50,000.

The National Malleable Castings Co., Cleveland, is contemplating the erection of a machine shop, 60 x 200 ft., adjoining its new plant on Woodhill Road.

The Lima Sheet Metal Products Co., Lima, Ohio, has purchased a site and will erect a plant providing 23,000 sq. ft. of floor space. It has increased its capital stock from $50,000 to $300,000 to take care of the growth in its business. C. S. Ackerman is president and H. W. Falk, secretary.

The American Welding & Mfg. Co., Warren, Ohio, has increased its capital stock from $200,000 to $500,000.

The United Electric Co., Canton, Ohio, manufacturer of suction sweepers, has increased its capital stock from $500,000 to $1,000,000.

The Harrold Forge & Tool Co., Columbiana, Ohio, maker of carpenters', machinists' and miners' tools, drop forgings, etc., has commenced the erection of additions and will install some new equipment, tripling the present capacity of the plant. It has increased its capital stock from $25,000 to $50,000.

The Industrial Appliance Co., Massillon, Ohio, is entering the stamp metal business and will be in the market for stamping machines and machine tools.

Cincinnati

CINCINNATI, Oct. 4.

The machinery market showed a slight improvement the past week. Some lines are dull, but good orders were booked for engine lathes and radial drills, including six lathes for the Missouri, Kansas & Texas Railroad and six for the Illinois Central, each going to a different manufacturer. The Ironton Engine Co., Ironton, Ohio, was a purchaser the past week, taking two radial drilling machines, and will likely buy several more. The U. S. Foil Co., Louisville, Ky., bought several grinders. Some inquiries for shaping machines have been received from South America and a Cincinnati 32-in. shaper has been sold to the Standard Oil Co. for shipment to Roumania. Foreign business is almost at a standstill. A machinery dealer from South Africa has been visiting Cincinnati manufacturers the past week and it is probable that before his departure some machine-tool purchases will be made.

The tightness of money is a large factor against buying at the present time. A representative of a leading machine-tool maker in this city who has visited the section east of Cincinnati in the past six weeks, states that he found the money situation holding up many purchases. Local machinery dealers find conditions fairly good, their salesmen reporting a latent demand which will undoubtedly develop into a buying movement when the Presidential campaign is over. A feature of the market the past week is the number of inquiries for small lathes from automobile repair shops in the West, particularly California. One lathe manufacturer has booked several orders from this source in the past two weeks.

Local foundries making machine-tool castings are running only four and five days a week, and in some instances a number of men have been laid off. The decreased operation is accounted for by the fact that during the machinists' strike foundries were not asked to cut down their shipments and stocks were built up faster than the castings were being machined.

Several crane propositions are still before the trade, the largest being from the Lunkenheimer Co. for five traveling cranes. The Cincinnati Shaper Co. bought two 2-ton Shepard hoists for its new shop, the order being placed through the J. K. Nickerson Co.

The Kelly Spring Co., Cincinnati, has been incorporated with a capitalization of $50,000 by L. J. Dole, W. C. Taylor, J. B. O'Donnell, J. D. Ellis and A. F. Sissler. It manufactures automobile springs and has a plant on Gilbert Avenue.

The Ashland Fire Brick Co., Ashland, Ky., has been authorized to increase its capitalization from $400,000 to $1,000,000. No extensions are contemplated at present.

The Columbus McKinnon Chain Co., Columbus, Ohio, will increase its capital stock to enlarge the capacity of its various plants.

The Hayden Automatic Block Machine Co., Columbus, Ohio, has moved its plant from West Broad Street to Michigan Avenue. In addition to conducting a general machine shop, it manufactures concrete block making machines.

Work has been started on an addition to the plant of the Champion Coated Paper Co., Hamilton, Ohio, 500 ft. long. F. Hill Smith, Dayton, Ohio, has the general contract.

Detroit

DETROIT, Oct. 4.

Owing to the present automotive situation the local machine-tool market is more quiet than at any time within the last four months.

The Frost Gear & Forge Co., Jackson, Mich., has increased its capitalization from $400,000 to $1,500,000. Contracts have been let for several additional plant units.

The Frederickson Axle Co., Benton Harbor, Mich., has been reorganized as the National Axle Co.

The Gove Motor Car Co., Brighton, Mich., is preparing to build its first factory unit, 80 x 220 ft., which will be one-fourth of the entire plant when completed.

The Hartford Automotive Parts Co., Hartford, Conn., which has purchased the Acme Universal Joint Co., Kalamazoo, Mich., has authorized the expenditure of $300,000 to increase the capacity of the Kalamazoo factory.

The Vissering Machine Co., Chicago, has purchased the Crary Machine Co.'s plant at Benton Harbor, Mich., and is erecting a new machine shop.

The Safety Clevis Co., Carsica, S. D., has moved its factory to Holland, Mich.

The Industrial Ignition Co., Flint, Mich., will soon start the erection of a new power house to cost about $60,000.

Construction is nearly completed on a new unit, 60 x 100 ft., two stories, for the Towar Motor Truck Co., Greenville, Mich.

The Monroe Auto Equipment Co., Monroe, Mich., is planning a new foundry, 90 x 120 ft., to cost about $100,000.

A welding plant has been opened in Lansing, Mich., by J. D. Beckett, formerly president Ox Welding Co., Grand Rapids, Mich. It will handle large castings and boiler jobs.

The Clark Engine & Boiler Co., Kalamazoo, Mich., will enlarge its capacity and increase its force from 80 men to 150.

The General Motors Corporation has placed an order for truck bodies and cabs with the Field Body Corporation, Owosso, Mich., to be delivered to the General Motors Truck Co. in Pontiac, Mich.

The Motor City Stamping Co., Detroit, manufacturer of metal stampings, etc., is having plans prepared for a new one-story plant, 80 x 90 ft., on Knodell Street, to cost about $70,000. Stahl & Kinsey, McKerchey Building, are architects.

The Wolverine Enameling & Japanning Corporation, Detroit, has changed its name to the Wayne Enameling & Japanning Corporation.

The Friend Motors Corporation, Pontiac, Mich., manufacturer of automobiles, is planning for additions to double its production. A preferred stock issue has been arranged to finance the expansion. Otis C. Friend is president.

The American Malleable Co., Owosso, Mich., has awarded a contract to the H. K. Ferguson Co., Vickers Building, Cleveland, for a new one-story brick and steel plant, to cost about $150,000.

The Blodgett Engineering & Tool Co., Kerr Building, Detroit, has filed plans for its proposed new four-story plant on Dalzelle Street.

The New Detroit Car Corporation, Detroit, recently organized, has taken options on about 600 acres near the State line, Cumberland, Md., as a site for new works and is negotiating for additional land to bring the holdings up to 1250 acres. Plans are under way for nine units, each 100 x 600 ft., with estimated cost in excess of $5,000,000. William Jordan is secretary and treasurer.

The Peninsular Stamping Co., Detroit, has increased its capital to $30,000.

The General Drop Forging Corporation, Leightner Building, Detroit, will take bids about the middle of November for its new one-story and basement plant on Salliotte Street, to cost about $85,000. J. D. Edmunds is president.

The Great Lakes Foundry Co., Port Huron, Mich., has filed plans for a new one-story foundry on Moar Street, 50 x 95 ft., to cost about $15,000.

The Metal Office Furniture Co., Grand Rapids, Mich., has increased its capital from $100,000 to $200,000.

The General Machine & Iron Works, Sixteenth and Pine streets, Detroit, has awarded contract to R. D. Runnings, 945 Vermont Street, for a one-story addition, 65 x 100 ft., to cost about $60,000.

The Northern Fibre Co., Ontonagon, Mich., has completed arrangements for the erection of a two-story plant, to cost about $350,000 with machinery.

The Refrigerating Machine & Heating Co., Detroit, has changed its name to the Refrigerating Machinery Co.

Milwaukee

MILWAUKEE, Oct. 4.

An otherwise dull and drifting machine-tool market has been featured by the placement of a small amount of business on railroad account. Inquiry from this source is increasing and is being manifested by transportation companies and manufacturers of materials and supplies. On the whole, however, new business is of restricted volume. The automotive industries are inactive and not much new trade is expected to develop before the end of the year. Milling machine makers are well occupied until Jan. 1 with old orders and new requirements that come in from day to day. Pressure on the railroads has been materially lessened, making it easier to furnish prompt deliveries than at any time within the last year or 18 months.

The Montana Tractor Co., Tinley Park, Ill., has awarded the general contract to the Austin Co., 208 South LaSalle Street, Chicago, for a one-story brick and steel machine and assembling shop, 150 x 200 ft., at Oconto, Wis. Equipment is now being purchased. The investment at Oconto will be about $150,000. C. M. Haight is vice-president in charge of this operation.

The Breitenbach Machine Co., Milwaukee, has been incorporated with a capital stock of $100,000 to develop the machine shop business conducted for several years at 1049-1051 Fifth Street by Clement V. and Eugene S. Breitenbach. G. A. Hormuth, L. C. Ziegler and E. G. Borisch are associated in the new enterprise, which will engage in the general manufacture of machinery, specializing in power farm operating equipment.

The Waukesha Foundry Co., Waukesha, Wis., has increased its capital stock from $10,000 to $40,000. It manufactures brass and aluminum castings and recently completed a new plant costing about $30,000.

The Wisconsin Bed Spring Co., Milwaukee, is negotiating for a site and intends to start work early next spring on the erection of a new factory to cost about $40,000 with equipment. It is operating in leased quarters at 968 Oakland Avenue. J. A. Mott is president and manager.

The Hess Mercury Carburetor Co., Valparaiso, Ind., is concluding negotiations with the new industries bureau of the Milwaukee Association of Commerce with a view of relocating its plant and headquarters in Milwaukee. It employs 300 at present. W. C. Hess is president and general manager.

The Latex Tire & Rubber Co., Fond du Lac, Wis., which recently commenced regular production in a new plant erected and equipped at a cost of $275,000, has increased its authorized capitalization from $500,000 to $1,000,000. Edward J. Yockey, Milwaukee, is president.

The Worthington Pump & Machinery Corporation, New York, has broken ground for a new four-story brick, concrete and steel sash pattern shop extension and storage vault, 60 x 175 ft., at Cudahy, to serve the local units, namely, the Power & Mining Machinery Co. and the International Steam Pump Co. The general contractor is William F. Tubesing, 139 Chestnut Street, Wauwatosa, Wis.

The H & M Body Corporation, Racine, Wis., has been incorporated in Delaware with an authorized capitalization of $1,575,000 and 15,000 shares of non-par value common stock, to take over the automobile body manufacturing department of the Mitchell Motors Co., Racine. The ownership is divided equally between the Hupp Motor Car Corporation, Detroit, and the Mitchell company. L. S. Noid, secretary-treasurer Mitchell Motors Co., is Wisconsin agent in the application for a local charter. The new ownership of the Mitchell body factories is planning material expansion to meet the increased demands growing out of the Hupp company's requirements.

The Balanced Valve Motor Co., Milwaukee, a $300,000 corporation which has maintained an experimental shop for

more than a year, is preparing to place its internal combustion engine design into quantity production. Negotiations are under way with the city officials and Chamber of Commerce, Wausau, Wis., looking to the establishment of the industry in that city. W. M. Baumheckel, Milwaukee, is president and chief engineer.

The Great Western Paper Co., Ladysmith, Wis., has been chartered with a capital stock of $500,000 to erect a pulp and paper mill, finishing plant, etc. The incorporators are O. M. Smith, A. R. Fenton and H. L. Woodruff, all of Milwaukee, representing paper manufacturing interests, the identity of which will not be disclosed for the present.

The Board of Education, DePere, Wis., has been authorized to secure plans for a new high school and vocational training institute, the cost not to exceed $100,000. An architect will be selected soon. Napoleon Van Sistine is chairman of the board.

California

LOS ANGELES, Sept. 28.

The Metal & Thermit Co., 333 Folsom Street, San Francisco, has awarded a contract to the Bates & Rogers Co., Chicago, for its new plant at South San Francisco, to cost about $100,000 exclusive of equipment. It will include a general manufacturing plant, 60 x 200 ft.; welding shop, 40 x 120 ft.; works building, 40 x 120 ft., and other structures. A power house will also be built.

The Healy Power & Engineering Co., Los Angeles, has been incorporated with a capital of $100,000 by P. J. Healy, O. J. Emme and P. J. Golden, to manufacture power machinery and parts.

The Pacific Foundry Co., Eighteenth and Harrison streets, San Francisco, has filed plans for a new one-story machine shop on West Treat Avenue.

The California Tractors, Inc., Stockton, Cal., manufacturer of motor-driven agricultural tractors, is considering the erection of a new plant at Modesto, Cal. Negotiations are under way with the Modesto Chamber of Commerce for a suitable site.

The Pomona Mfg. Co., Pomona, Cal., manufacturer of iron and steel castings, machinery, etc., has completed plans for a one-story machine shop to cost about $25,000.

The Scripps-Booth Co., Oakland, Cal., a division of the General Motors Corporation, has awarded contract to the P. J. Walker Co., Monadnock Building, San Francisco, for a new plant to cost about $300,000. It will be of reinforced concrete, U-shaped, with each wing 150 ft. long.

The Direct Steel Process Co., San Jose, Cal., recently organized, is arranging for the establishment of a plant for the manufacture of iron and steel specialties, including castings. It is headed by Robert Lang, Oakland, Cal.; W. J. Johnston and Charles H. Nash, San Jose.

The Fageol Motor Co., Foothill Boulevard and 107th Avenue, Oakland, has awarded contract to the Austin Co., Pacific Building, San Francisco, for new reinforced-concrete works for the manufacture of automobile motors and parts. It will cost about $25,000.

The Central South

ST. LOUIS, Oct. 4.

The Missouri Car Co., Central National Bank Building, St. Louis, recently organized with a capital of $500,000, has engaged Eames & Young, architects, and Brussel & Viterbo, consulting engineers, both with offices in the Arcade Building, to prepare plans for its new works. The main building will be 100 x 400 ft., with metal working department, machine shop, foundry, cabinet and wood-working shop, etc. A power plant will also be built. It will specialize in the production of street railroad cars of one-man safety type. The projected plant is estimated to cost about $300,000 and bids will be taken during the coming month. Theodore A. Brewster is president and J. J. O'Brien, vice-president and treasurer.

The Missouri, Kansas & Texas Railway, Railway Exchange Building, St. Louis, has awarded a contract to H. D. McCoy, 107 West Henderson Street, Clebourne, Tex., for its proposed new shops at Oklahoma City, Okla., for general locomotive and car construction and repairs, estimated to cost about $150,000.

The Sunshine Safety Lamp Co., 1005 McGee Street, Kansas City, Mo., manufacturer of electric lamps, is having plans prepared for a new one-story and basement plant, 50 x 115 ft., on Walnut Street.

The Wichita Clear Vision Pump Co., 1107 East Douglas Avenue, Wichita, Kan., is planning for the erection of a new one-story works, 75 x 325 ft., to manufacture visible type gasoline pumps. A machine shop will also be built. The entire plant is estimated to cost in excess of $40,000, including equipment.

The Magnus Metal Co., 4153 Clayton Avenue, St. Louis, will defer the erection of its one-story foundry on Clayton Avenue, estimated to cost about $55,000, until early next year. Contract has been let to the Wimmer Construction Co., Victoria Building.

The Woods-Evertz Stove Co., Springfield, Mo., has plans under way for a two-story foundry to cost about $100,000.

Fire, Sept. 20, originating in the power house at the works of the Cotton Plant Veneer Co., Newport, Ark., destroyed that building and other departments with loss estimated at $35,000, including machinery.

The Topeka Foundry & Iron Co., 318-22 Jackson Street, Topeka, Kan., is arranging for the construction of a new plant, comprising a general metal works, structural shop, machine shop and foundry, estimated to cost, with equipment, about $100,000.

The Automotive Equipment Co., Claremont, Okla., has been incorporated with a capital of $25,000 by L. C. and D. E. Carpenter and J. M. Pope, to manufacture automobile parts and other products.

The Memphis Iron & Steel Co., Memphis, Tenn., recently organized with a capital of $300,000, will operate a local works for the manufacture of bar iron. It has acquired a site and building, and plans the immediate installation of equipment. B. L. Mallory is president.

The Machinery Supply Corporation, Joplin, Mo., will build a factory, 200 x 400 ft.

A. B. Patterson, Tulsa, Okla., has plans for the equipment of a machine shop.

The Kansas City Power & Light Co., Kansas City, Mo., J. F. Porter, president, will enlarge its plant, installing a second condenser, one 30,000-kw. turbo generator with auxiliaries and other equipment at a cost of about $2,500,000.

The Tonkawa Ice Co., Tonkawa, Okla., M. Schonwald, president, will install about $30,000 worth of ice making machinery.

The Gulf States

BIRMINGHAM, Oct. 4.

The Southern Motor Mfg. Association, Houston, Tex., has awarded a contract to A. C. Mundee, Houston, for its new local plant to cost about $60,000. The initial buildings will consist of a foundry, equipped for a daily output of about 12 tons of malleable castings and six tons of gray iron castings. The equipment will include a trolley installation for material handling.

The Board of Education, Dallas, Tex., is arranging for the installation of a manual training department in the three-story high school to be erected at McKinney and Haskell streets, at a cost of $600,000. The divisions will include a machine shop, foundry, metal working plant, wood-working department, etc.

The Linde Air Products Co., 30 East Forty-second Street, New York, has plans under way for its new plant at New Orleans. It will be one-story, 125 x 125 ft., and is estimated to cost about $300,000, including machinery.

The Shiner Compress Co., Shiner, Tex., is planning for the early rebuilding of its cotton compress plant, recently destroyed by fire with loss estimated at $85,000. V. J. Grunder, Cuero, Tex., is president.

Fire, Sept. 24, destroyed the plant and machinery of the Key West Box Co., Key West, Fla., with loss estimated at $150,000. It will be rebuilt.

The Beaumont Shipbuilding & Dry Dock Co., Beaumont, Tex., is planning for a new one-story machine shop to cost about $100,000, including equipment.

The St. Louis Southwestern Railway, Dallas, Tex., has arranged an appropriation of $170,000 for additions and improvements in its locomotive and car repair shops. A. A. Mathews, Tyler, Tex., is chief engineer.

The Robinson Carburetor Corporation, Birmingham, Ala., has been incorporated with a capital of $5,000,000 under Delaware laws by J. F. Berry Baugh, Ray J. Emmerson and W. L. Shumate, Jr., to manufacture carburetors and ignition equipment.

The American Blakeslee Mfg. Co., Birmingham, Ala., manufacturer of iron and steel products, has plans under way for a new one-story brick and steel foundry.

The Kansas City Packing Box Co., Kansas City, Kan., has acquired about 10 acres at Bastrop, La., and has plans under way for a new paper pulp plant to cost about $1,000,000, including machinery. It is expected to give employment to about 500 for initial operations. The company is operating similar works at Bogalusa, La.

Gilbert D. Von Phul, Poyfarre Street, New Orleans, La., is organizing a company to establish a local plant for the manufacture of sugar machinery. A site, 300 x 300 ft., has been purchased, and plans are under way for the erection of

a machine shop, foundry and general metal working plant. Arrangements have been made to handle assembling at another location.

The Denkman Lumber Co., Norwald, Miss., will rebuild its lumber mill burned with a loss of $250,000.

The United Fiber & Products Co., William T. Larkin, president, 1520 Fidelity Building, Baltimore, Md., will add about $300,000 worth of new equipment to the plant acquired from the Sugar Cane By-products Co., New Iberia, La., for the manufacture of paper.

The Dantzler Foundry & Machine Works, Gulfport, Miss., will install new equipment to manufacture heavy machinery.

The Planters Oil Mill & Gin Co., Kosciusko, Miss., is in the market for one 18 to 24-in. engine lathe and a 25-in. back geared drill press.

Frank Varino & Co., West Monroe, La., will install a refrigerating plant to cost $60,000.

The American Blakeslee Co., Woodlawn, Ala., will build a foundry at a cost of about $4,000.

Indiana

INDIANAPOLIS, Oct. 4.

The Westinghouse Lamp Co., 165 Broadway, New York, has filed plans for its new four-story plant, 80 x 400 ft., at 3200 East Michigan Avenue, Indianapolis, to cost about $500,000.

The Alexandria Metal Products Co., Alexandria, Ind., recently organized, will establish a plant in the Harry Wells foundry building.

The Rockwood Mfg. Co., 1801 English Avenue, Indianapolis, has filed plans for a one-story power house, 54 x 54 ft., at its pulley manufacturing factory.

The Wawasee Tire & Rubber Co., Syracuse, Ind., has plans under way for the superstructure of its new three-story plant for the manufacture of automobile tires, estimated to cost about $500,000. R. L. Simmons, Monger Building, Elkhart, Ind., is architect and engineer.

The Sandusky Cement Co., Cleveland, has acquired a site at Logansport, Ind., for a new plant.

The Pacific Northwest

SEATTLE, Sept. 28.

Reports from various sections of the Northwest indicate a slight improvement in buying, with a tendency, however, to purchase only for immediate needs. Manufacturing activity has also improved.

The Tregoning Boat Co., Seattle, will add sash, door and mill work to its line. Alterations will be made to the plant and new machinery purchased.

The Pacific Coast Engineering Co., Seattle, on its bid of $82,500, secured the contract for converting the Japanese-built steamship Eastern Leader from a coal-burner to an oil-burner. The Seattle office of the Emergency Fleet Corporation will call shortly for bids on improvements and alterations to the steamship Eastern Sword.

The plant of the Boundary Iron Works, Grand Forks, B. C., was recently partially destroyed by fire with loss of $5,000. The foundry was completely burned and will be rebuilt immediately on a larger scale. John McKie is owner.

Miller, Windle & Keidel, Kalama, Wash., plan a new shingle mill with a daily capacity of 200,000 shingles.

Bids will be called for shortly by George W. Lawton, architect, for an addition to the plant of the Seattle-Astoria Iron Works, Seattle. It will be 50 x 110 ft. and cost $10,000, exclusive of equipment.

The Independent Paper Co., San Francisco, contemplates the construction in Portland, Ore., of a one-story brick factory, 80 x 100 ft., costing $25,000. Two other buildings are planned, 39 x 106 ft., to cost $6,500, and 20 x 97 ft., to cost $2,500, both one-story.

The Doran Brass Foundry Co., Seattle, has secured from the Emergency Fleet Corporation contract for 30 manganese bronze ship propeller wheels, costing $250,000. It is now engaged in the manufacture of 60 similar wheels, costing $500,000. They will be delivered at the rate of five a week.

Canada

TORONTO, Oct. 4.

The Ruggles Motor Truck Co., Ltd., London, has been incorporated with a capital stock of $3,000,000 by George McE. Reid, John F. Grant, John C. Elliott and others to manufacture motor trucks, tractors, farm implements, etc. It has secured a site on Dundas Street and will start work in the near future on the erection of a plant 86 x 417 ft., to cost $250,000.

The Canadian National Railways will make improvements to its plant at Chaudiere Junction, Que., to cost $200,000. The work will include an extension to the engine house and the installation of a coal plant.

The Exide Battery Co. of Canada, Ltd., 153 Dufferin Street, Toronto, Ont., will make alterations to its buildings and install additional machinery to cost $50,000.

R. C. Desrochers, secretary, Department of Public Works, Ottawa, Ont., will receive bids until Dec. 9 for the construction of a drydock at Esquimalt, B. C., to cost $5,000,000 for the Dominion Government. Plans are with the district engineers at Victoria, B. C.; Toronto, Montreal, and Department of Public Works, Ottawa.

The shipbuilding plant owned by the Souther Salvage Co., Liverpool, N. S., was destroyed by fire with a loss of $10,000.

Beatty Brothers, London, Ont., manufacturers of barn and agricultural equipment, etc., are preparing plans for addition.

The John Inglis Co., Strachan Avenue, Toronto, manufacturer of iron, steel and metal goods, engines, motors, etc., will build an addition to its plant.

The Bell Thread Co., Ltd., Hamilton, Ont., is in the market for a 40-hp. high-speed engine.

The McLargan Phonograph Corporation, Ltd., Stratford, Ont., has been incorporated with a capital stock of $300,000 by David M. Wright, William J. Anderson, Frederick G. Scrimgeour and others to manufacture musical instruments, motors, phonographs, etc.

The Mongolia Metal Co. of Canada, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by Aubrey H. Elder, Felix W. Hackett, D. Burley Smith and others to manufacture castings, forgings, machinery, etc. It will start work at once on the erection of a plant.

Guarantee Batteries, Ltd., Guelph, Ont., has been incorporated with a capital stock of $300,000 by Charles L. Dunbar, Leo W. Goetz, James Sutherland and others to manufacture tools, electrical equipment, etc.

H. G. Langford, Ltd., Ottawa, Ont., has been incorporated with a capital stock of $50,000 by Harry G. Langford, Sydney B. Wallace and others to manufacture watches, clocks, machinery, etc.

The Brantford Machine & Tool Co., Ltd., Brantford, Ont., has been incorporated with a capital stock of $50,000 by Robert O. Cumback, William J. Ham and others to manufacture machinery, tools, motors, etc. It is building an addition to its plant to cost $50,000.

New Books Received

Bank Credit, a study of the principles and factors underlying advances made by banks to borrowers, by Chester A. Phillips. Pages, xiv + 374, 5½ x 8¼ in. Published by the MacMillan Co., 64 Fifth Avenue, New York.

Fuel Oil in Industry, by Stephen O. Andros. Pages, 244, 6 x 9 in. Published by the Shaw Publishing Co., 910 South Michigan Boulevard, Chicago.

Pleading for Justice, a novel, with an industrial background, by W. C. Burns. Pages, x + 316, 5 x 7⅜ in. Published by Justice Publishing Co., 1465 Broadway, New York.

A. S. T. M. Standards—standards adopted in 1920 by the American Society for Testing Materials. Published by the society, 1315 Spruce Street, Philadelphia.

The New World, a study of present world problems, concluding with a proposed solution of the problem of capital versus labor, by Frank Comerford. Pages, 364, 5 x 7⅜ in. Published by D. Appleton & Co., 35 West Thirty-second Street, New York.

Industrial Housing, with discussion of accompanying activities, such as town planning, street systems, development of utility services and related engineering and construction features, by Morris Knowles. Pages, 408, 6 x 9 in. Published by McGraw-Hill Book Co., 239 West Thirty-ninth Street, New York, and for sale by THE IRON AGE book department.

How to Make and How to Use Concrete, by H. Colin Campbell, Pages, 152, 5 x 7⅜ in. Published by Ransome Concrete Machinery Co., 115 Broadway, New York.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron, base price	5.50c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.63c. to 4.75c.
1 to 6 in. x ⅜ to 1 in.	3.63c. to 4.75c.
1 to 6 in. x ¼ to 5/16	3.73c. to 4.75c.
Rods—⅝ and 11/16	3.68c. to 5.45c.
Bands—1½ to 6 by 3/16 to No. 8	4.33c. to 7.00c.
Hoops	5.68c. to 7.00c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 4.50c.
Angles:	
3 in. x ¼ in. and larger	3.58c. to 4.50c.
3 in. x 3/16 in. and ⅛ in.	3.83c. to 5.10c.
1½ to 2½ in. x ⅛ in.	3.63c. to 4.90c.
1½ to 2¾ in. x 3/16 in. and thicker	3.58c. to 4.85c.
1 to 1¼ in. x 3/16 in.	3.63c. to 4.90c.
1 to 1¼ x ⅛ in.	3.68c. to 4.95c.
⅞ x ⅞ x ⅛ in.	3.73c. to 5.00c.
¾ x ⅛ in.	3.78c. to 5.05c.
⅝ x ⅛ in.	4.18c. to 5.95c.
½ x 3/32 in.	5.28c. to 7.65c.
Tees:	
1 x ⅛ in.	3.98c. to 5.90c.
1¼ in. x 1¼ x 3/16 in.	3.88c. to 5.80c.
1½ to 2½ x 3/16 in. and thicker	3.68c. to 5.60c.
3 in. and larger	3.63c. to 5.30c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	5.40c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	5.90c.
Toe calk, ½ x ⅜ in. and larger	6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

¼ in. and heavier	3.78c. to 4.50c.

Sheets

Blue Annealed

	Per Lb.
No. 10	7.25c. to 8.30c.
No. 12	7.28c. to 8.35c.
No. 14	7.35c. to 8.40c.
No. 16	7.45c. to 8.50c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20	8.40c. to 9.90c.	—
Nos. 22 and 24	8.45c. to 9.85c.	10.80c.
No. 26	8.50c. to 9.90c.	10.85c.
No. 28	8.60c. to 10.00c.	11.00c.
No. 30	8.70c. to 10.10c.	—

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	8.85c. to 11.00c.
No. 16	9.10c. to 11.25c.
Nos. 18 and 20	9.25c. to 11.40c.
Nos. 22 and 24	9.40c. to 11.55c.
No. 26	9.55c. to 11.70c.
No. 27	9.70c. to 11.85c.
No. 28	9.85c. to 12.00c.
No. 30	10.35c. to 12.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—34	—17	¾-1½ in. Butt.	— 3	+17
¾-3 in. Butt.	—38	—22	2 in. Lap.....	+ 3	+21
3½-6 in. Lap.	—33	—18	2½-6 in. Lap...	+ 1	+17
7-12 in. Lap..	—23	— 6	7-12 in. Lap...	+12	+30

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	10.00c.
Annealed soft	10.00c.
Galvanized annealed	10.75c.
Coppered basic	10.50c.
Tinned soft Bessemer	12.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	28¼c. to 29½c.
High brass wire	28¼c. to 29½c.
Brass rod	26¾c. to 29 c.
Brass tube	43½c. to 45½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	11.80	11.55
		90 lb...	11.90	11.65
		100 lb...	12.00	11.75
IC...$16.50	$14.25	IC...	12.25	12.00
IX... 18.75	16.25	IX...	13.25	13.00
IXX... 20.50	18.00	IXX...	14.25	14.00
IXXX... 22.25	19.75	IXXX...	15.25	15.00
IXXXX... 23.75	21.50	IXXXX...	16.25	16.00

Terne Plates

8-lb. Coating 14 x 20

100 lb	$ 9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	47c.
Bar	55c. to 59c.

Copper

Lake ingot	19¾c.
Electrolytic	19¼c.
Casting	19c.

Spelter and Sheet Zinc

Western spelter	9½c. to 10c.
Sheet zinc, No. 9 base, casks	14½c. open 15c.

Lead and Solder*

American pig lead	8¾c. to 9¾c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed	34c.
No. 1 solder	31c.
Refined solder	27c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c.
Commercial grade, per lb.	50c.

Antimony

Asiatic	9c. to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c.

Old Metals

The market is quiet and very little business is being put through. Quotations are generally lower than last week. Dealers' buying prices are as follows:

	Cents per lb.
Copper, heavy and crucible	14.7
Copper, heavy and wire	14.0
Copper, light and bottoms	12.5
Brass, heavy	9.0
Brass, light	6.7
Heavy machine composition	14.2
No. 1 yellow brass turnings	8.7
No. 1 red brass or composition turnings	11.7
Lead, heavy,	6.5
Lead, tea	4.0
Zinc	5.2

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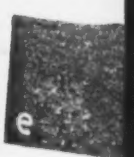

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[1]Physicist, B
merce, Washingt
the bureau.
[2]J. Czochralsk
Metallographic E
II, p. 1073, 1915.
[3]Treadwell; A